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Research Article

A revision of Afrotropical *Asceua* (Araneae, Zodariidae), ant-eating spiders with puzzling distributions

Rudy Jocqué[1], Arnaud Henrard[1]

1 *Royal Museum for Central Africa, Leuvensesteenweg 13, B-3080 Tervuren, Belgium*
Corresponding author: Rudy Jocqué (debarst@telenet.be)

Abstract

The Afrotropical representatives of the zodariid spider genus *Asceua* Thorell, 1889 are revised. Apart from the known species *A. radiosa* Jocqué, 1986 (Comoros, Mayotte) and *A. lejeunei* Jocqué, 1991 (DR Congo, Ethiopia, Ghana, Guinea, Ivory Coast, Nigeria), six new species are recognized and described: *A. arborivaga* **sp. nov.** (♀, Guinea), *A. foordi* **sp. nov.**, (♂♀, DR Congo, Guinea, South Africa), *A. incensa* **sp. nov.** (♂♀, DR Congo), *A. luki* **sp. nov.** (♂♀, DR Congo), *A. palustris* **sp. nov.** (♀, DR Congo) and *A. ventrofigurata* **sp. nov.** (♂♀, Tanzania). A key to the species is provided. Some of the species have a very large distribution, which is unusual in the Zodariidae. The phenomenon is probably linked to the canopy dwelling behaviour, which appears common in the genus but unique for this spider family.

Key words: Africa, ant-eating spider, ant mimicry, canopy dwellers, ecology, taxonomy

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Introduction

Zodariidae is among the larger spider families, and are commonly known as ant-eating or burrowing spiders. Although a few genera in the Cryptothelinae such as *Thaumastochilus* Simon, 1897, *Storenomorpha* Simon, 1884 and *Chariobas* Simon, 1893 live in burrows in wood (Jocqué 1994; Jocqué and Bosmans 1989 or rolled grass leaves (Leroy and Jocqué 1993), the majority of the species are ground dwelling (Jocqué 1991; Dippenaar-Schoeman 2023). Apart from an odd specimen of *Mallinella* Strand, 1906 (personal observation), representatives of *Asceua* Thorell, 1889, are the only zodariids appearing regularly in canopy samples, indicating an arboreal lifestyle (e.g. Komatsu 2016). There is no doubt that these spiders belong in the canopy fauna, but strangely enough they are also often found in the litter layer of forest and woodland. This peculiar mixed lifestyle may be part of the explanation of the puzzling distribution of the African species in the genus. So far only two species (*A. radiosa* Jocqué, 1986 and *A. lejeunei* Jocqué, 1991) were known from Africa. In the present paper we describe six more species, some of which have a remarkable distribution. We provide a key to the African species and discuss the distributions.

Materials and methods

Specimens were observed and drawn with a WILD M 10 stereomicroscope. Photographs of the habitus, details of mouthparts, detached male palps, female genitalia and measurements were taken with a DFC500 camera mounted on a Leica MZ16A and piloted with the Leica Application Suite automontage software (LAS ver. 4.13). The epigynes were dissected and digested using half a tablet of Total Care Enzima product (protein removal system originally for cleaning contact lenses and containing subtilisin A-0,4 mg per tablet; Abbott Medical Optics, Santa Ana, CA) in a few millilitres of distilled water overnight, then immersed in 75% ethanol to be photographed and stored. Some detached epigynes were not digested but temporarily mounted in a clearing mixture of methyl salicylate and cedukol (Merck, Darmstadt) and photographed as explained above. Photographs of specimens of the Royal Museum for Central Africa (**RMCA**) are accessible through the RMCA Virtual Collection website (https://virtualcol.africamuseum.be). For scanning electron micrographs (**SEM**), specimens were first transferred to fresh 100% ethanol overnight, then to acetone overnight, and finally air dried on a heated plate set at 50 °C. The dried samples were glued to aluminium stubs using double-sided copper tape, and sputter coated with gold then examined and photographed with a JEOL 6480 LV scanning electron microscope at 5 to 12 kV. All measurements are in millimetres. The distribution map was prepared with the online software SimpleMappr (Shorthouse 2010).

Abbreviations: **ALE** = anterior lateral eyes; **AME** = anterior median eyes; **C** = conductor; **CF** = cymbial fold; **CL** = carapace length; **DP** = dorsal prong of palpal tibial apophysis; **Ex** = small prolateral extension of the median prong; **Fe** = femur; **P** = patella; **MOQ** = median ocular quadrangle; **MA** = median apophysis; **MP** = median prong of palpal tibial apophysis; **Mt** = metatarsus; **O** = copulatory opening; **PLE** = posterior lateral eyes; **PME** = posterior median eyes; **Sc** = epigynal scape; **t** = tarsus; **Ti** = tibia; **TL** = total body length; **TT** = tegular tooth; **VP** = ventral prong of palpal tibial apophysis.

Repositories: **NCA** = National Collection of Arachnida (non-Acari) of the Agricultural Research Council, Pretoria, South Africa (R. Lyle); **RMCA** = Royal Museum for Central Africa, Tervuren, Belgium (D. Van den Spiegel).

Remark: The arachnological collection of the RMCA is identified by the acronym “BE_RMCA_ARA.Ara.”. This acronym is followed by a unique code for each recorded sample, and, for the sake of clarity, it is simplified by RMCA_xxxxxx in the text.

Taxonomy

Zodariidae Thorell, 1881
Zodariinae Simon, 1893

***Asceua* Thorell, 1887**

Diagnosis (modified from Jocqué 1991). *Asceua* belongs to the dual femoral organ clade (Henrard and Jocqué 2015) which only contains *Suffasia* Jocqué, 1991, *Suffrica* Henrard & Jocqué, 2015 and *Suffascar* Henrard & Jocqué, 2017.

Asceua are recognized by the narrow, compressed cymbium (male), the superficially intricately wound ducts in the epigyne (female) and the presence of only one or two spines on the femora.

Description (modified from Jocqué 1991). Small spiders (2.5–4.5), with relatively high, oval carapace, without cervical grooves, widest at level of coxae II; narrowed in front to 0.65 maximum width in males and to about 0.75 times maximum carapace width in females. Highest point in profile between PME and fovea. Tegument smooth or finely granulated. Colour: Carapace, chelicerae, and sternum orange to dark brown; legs basically yellow to brown with dark stripes, femora usually with pale base. Abdomen dark grey with pale dorsal patches; venter pale or grey, rarely with pattern. Eyes in two procurved rows; ALE dark, circular; remainder pale, circular; eyes subequal. AME less than their diameter apart and at similar distance from ALE. PME about their diameter apart and slightly further from PLE, which are close to ALE. MOQ wider in back than in front and slightly longer than posterior width. Clypeus about three times as high as width of ALE, convex and protruding. Chilum single triangular sclerite, approximately as high as wide, rarely wider and oval. Chelicerae promargin with two small teeth; retromargin with one tooth near fang base (Fig. 11A, B); with patch of pores on inner face at anterior half (Fig. 11A, C). Endites and labium typical for subfamily (Fig. 11D); meso-apical part of the endites with modified, biseriate setae with dorsal tooth (Fig. 11E). Sternum bulging; roughly triangular with slight lateral triangles, corresponding with coxal concavities. Legs: Formula 4123 or 4132. Spination very poor; at most 1 or 2 dorsal spines on femora. Distoventral tuft of hairs poorly developed on Mt III and IV, but with clearly chisel-shaped setae (Fig. 11H, I). Hinged setae absent. Three claws: paired ones with about 10 teeth on legs I and II, with 4 or 5 teeth on legs III and IV. Inferior claw very small or vestigial, on protruding support. Tarsi I and II fusiform, III and IV laterally compressed. Legs beset with indented setae, which may be flat. Trichobothria in two rows on T, in one row on Mt and t; distal trichobothrium on Mt long (Fig. 11J). Femora provided with two femoral organs (Fig. 11K, L): a shallow perforated depression, with few curved, undivided setae. Abdomen oval, with dorsal scutum and epiandrum in male. Spinnerets 4 in male, 6 in female. Colulus represented by transverse row of few setae. Tracheal spiracle narrow, slightly procurved, anterior rim slightly sclerotized. Male palp with short tibia, provided with one or more short lateral and/or dorsal apophyses; cymbium very narrow as seen from above, due to wide lateral fold. Embolus thread-like, originating on mesoproximal side of tegulum, the latter with small median apophysis and membranous conductor. Female palp with finely pectinate claw, turned inward over 90° (Fig. 11F). Tarsus slightly fusiform. Epigyne often with transparent scape; copulatory ducts long, coiled, leading to tubular, rarely spherical, spermathecae.

Key to the Afrotropical species of *Asceua*

Species included:

A. arborivaga sp. nov. ♀
A. foordi sp. nov. ♂♀
A. incensa sp. nov. ♂♀

A. lejeunei Jocqué, 1991 ♂♀
A. luki sp. nov. ♂♀
A. palustris sp. nov. ♀
A. radiosa Jocqué, 1986 ♂♀
A. ventrofigurata sp. nov. ♂♀

1 Males.....**2**
– Females.....**7**
2 Palp with cymbial retrolateral fold narrow, extended over 2/3 of cymbium length (Figs 19D, 20C); palpal tibia with two apophyses; (Figs 19D, 20C); embolus slightly curved, not sinuous (Figs 19B, C, 20B)..... .....***A. radiosa* Jocqué, 1986**
– Palp with cymbial retrolateral fold wide, extended over almost entire cymbium length (Figs 4B, 5B, 8C, 9B, 12C, 13B); palpal tibia with three apophysis (Figs 4B, 5B, 8C, 9B, 12C, 13B); embolus strongly curved and sinuous (Figs 4A, 5A, 8A, B, 9A, 12A, B, 13B).....**3**
3 Distal part of cymbial retrolateral fold deep and curved upwards (Figs 4B, 5B) ..... ***A. foordi* sp. nov.**
– Cymbial retrolateral fold smoothly curved to distal tip (Figs 8C, 9B, 12C, 13B, 15B, C, 16B) **4**
4 Dark species with dark abdominal venter (Fig. 7B); chilum much wider than high ..... ***A. incensa* sp. nov.**
– Abdominal venter pale or with dark pattern on pale background (Figs 14C, 21D); chillum triangular, as wide as high **5**
5 AME large (diameter 1.5 times ALE); venter of abdomen with dark pattern on pale background (Fig. 21B); dorsal prong on palpal tibia broad, its spine implanted subdistally directed forward at an angle of 90° with the base (Figs 22B, C, 23B); MA with three small teeth (Figs 22B, D, E, 23B)..... .....***A. ventrofigurata***
– AME of similar size as ALE; abdominal venter uniform pale; dorsal prong of palpal tibial apophysis slender, with spine at extremity **6**
6 Cymbium without retrobasal button like process (Fig. 12C); Dorsal prong of palpal tibial apophysis parallel-sided up to distal tip (Figs 12C, 13 B); tegular tooth subdistal and visible from both sides (Fig. 13A, B) ....***A. lejeunei* Jocqué, 1991**
– Cymbium with retrobasal button-like process fitting DP concavity (Fig. 15B); Dorsal prong of palpal tibial apophysis tapered up to distal tip (Fig. 16B); (Fig. 15D, E); tegular tooth distal and visible from retrolateral side only (Figs 15B, C, 16B) ..... ***A. luki***
7 Dorsum of abdomen with intricate dark and pale pattern (Figs 18F, G, H); epigyne without scape (Figs 19E, 20E); spermathecae well defined, rounded (Fig. 19F).....***A. radiosa***
– Dorsum of abdomen with pale spots on dark background (Figs 3D, 6A, B, 7C, 10A, H, 13C, 14E, 21D); epigyne with scape (most often transparent and inconspicuous); spermathecae tubular **8**
8 Scape narrow and long, main part widest in the middle, tip almost reaching the epigastric furrow (Fig. 2A–C, H) .....***A. arborivaga***
– Scape either parallel sided or widened at posterior tip.....**9**

9 Dark species with dark abdominal venter (Fig. 7F); chilum much wider than high ..... ***A. incensa***
– Abdominal venter pale or with dark pattern on pale background (Figs 3E, 21E); chilum triangular, as wide as high.....**10**
10 Scape with parallel sides (Figs 22F, 23D), copulatory ducts wider (Figs 8F–H, 12F, G) **11**
– Scape strongly widened at posterior tip (Figs 4C, D, 5C, 15D, 16C), copulatory ducts narrower (Figs 4C–E, 17D–F) **13**
11 Scape long, about 4/5 of epigyne length (Fig. 23D); less than five copulatory duct coils visible in transparency.....**12**
– Scape shorter, 3/4 of epigyne length, indented at tip (Fig. 13D); six copulatory duct coils visible in transparency..... ***A. lejeunei***
12 Venter of abdomen with dark pattern on pale background (Fig. 21E); vulva anteriorly with two copulatory duct coils (Fig. 22G, H).....***A. ventrofigurata***
– Venter of abdomen uniform pale (Fig. 14F); vulva anteriorly with three copulatory duct coils (Fig. 15G, H) ..... ***A. luki***
13 Epigyne with at least six coils of copulatory ducts visible in transparency (Figs 4C, 5C); beginning of copulatory ducts not crossing (Fig. 4E)..... ..... ***A. foordi***
– Less than six copulatory ducts visible in transparency (Fig. 17D); beginning of copulatory ducts crossing (Fig. 17D, G) .....***A. palustris***

Descriptions

***Asceua arborivaga* sp. nov.**
https://zoobank.org/7B3154FF-B078-4C11-8215-0D550FBE5A61
Figs 1, 2, 24

Material examined. *Holotype*: GUINEA • ♀; Mount Nimba, Fouenyi Forest; 7°40'00.0"N, 8°28'00.0"W; 1.III.2012; sieving litter under trees; A. Henrard, C. Allard, P. Bimou, and M. Sidibé leg., RMCA_247163.

***Paratypes*:** GUINEA • 1♀; same data as holotype; RMCA_247298; • 2♀♀; Mount Nimba, Nzérékoré, Gouan Forest (mid one) near SMFG camp site; 7°42'02.9"N, 8°23'57.8"W; 6.X.2011; litter in trees and shrubs; at 1.5–3 m above the floor; A. Henrard, and D. VandenSpiegel leg.; RMCA_247161.

Diagnosis. Females of this species are recognised by the dark dorsum of the abdomen with two V-shaped pairs of pale spots (Fig. 1A, B), by the epigyne with a long, narrow, tapered scape (Fig. 2A–D, H) and by the duct conformation of the vulva (Fig. 2E–G).

Etymology. The specific name, *arborivaga* means 'active in trees', refers to the ecology of the species, which has been found in litter but also in trees.

Description. Female Holotype. Fig. 1A–E. TL 3.91. Colour in ethanol: carapace with dark thoracic area and medium brown cephalic area with faint darker 'V' in front of fovea and narrow dark rings around eyes; chelicerae uniform medium brown; endites and labium pale brown with pale anterior margin; sternum dark brown, paler in the centre; legs: coxae white, trochanters dark brown, femora with narrow proximal dark ring, wider pale ring and distal 2/3 dark brown, patellae pale with pro- and retrolateral dark patch, tibiae pale with ventral dark stripe;

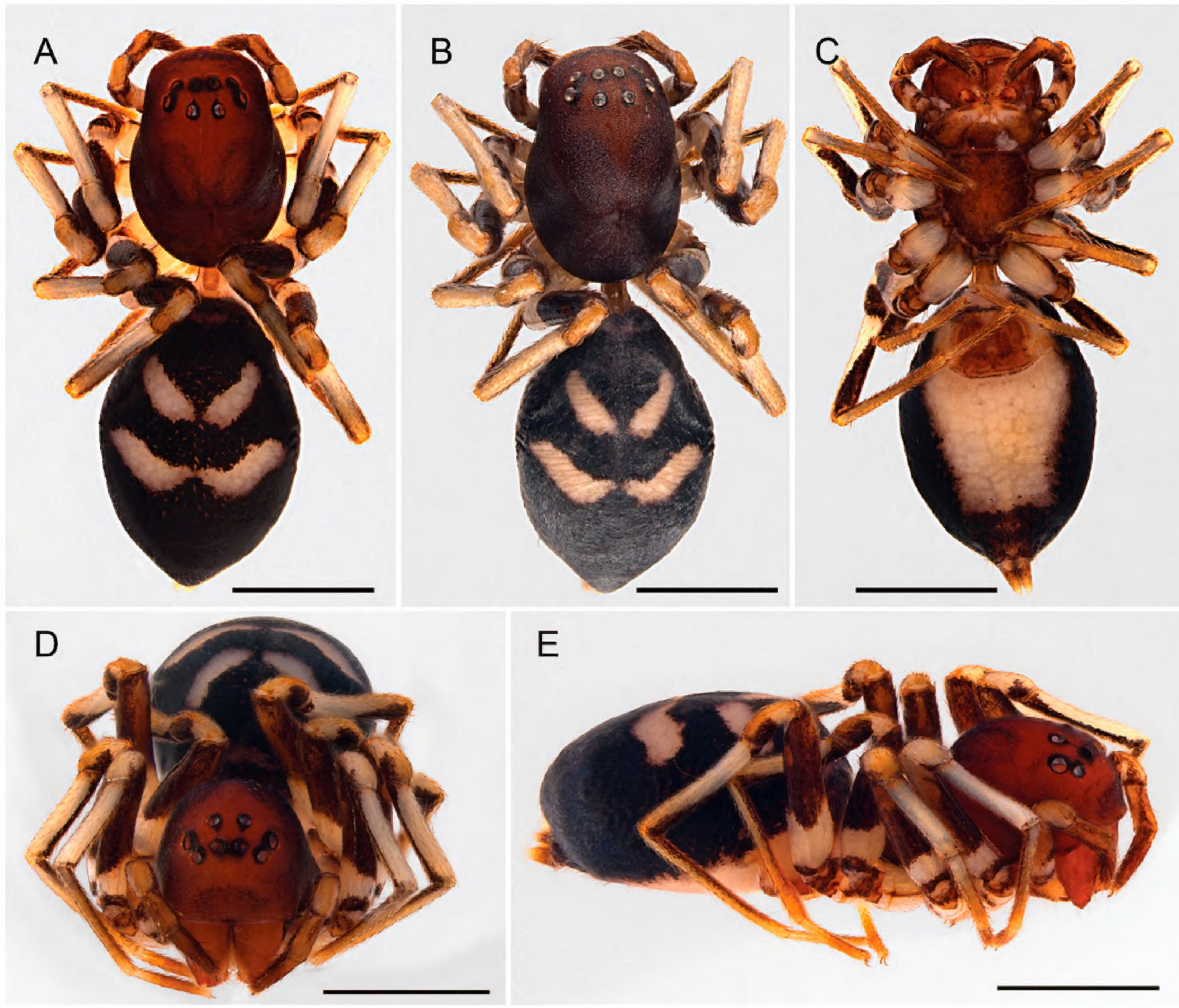

Figure 1. *Asceua arborivaga* sp. nov., Holotype female habitus **A** dorsal view **B** idem, air dried (out of alcohol for a few minutes) **C** ventral view **D** frontal view **E** lateral view. Scale bars: 1 mm.

dorsum of abdomen black with two pairs of white blotches arranged in V-shape, and tiny white spot in front of spinnerets; sides uniform black extended on venter in front of pale yellow spinnerets, remainder of venter pale. Carapace 1.70 long, 1.14 wide, 0.78 high. Eye sizes and interdistances: AME: 0.10; ALE: 0.08; AME–AME: 0.03; AME–ALE: 0.05; PME: 0.09: PLE: 0.12; PME–PME: 0.12; PME–PLE: 0.13. MOQ: frontal width 0.23, posterior width 0.30, length 0.30. Clypeus 0.36 high. Chilum: small triangle 0.12 wide, 0.10 high. Sternum shield-shaped, 0.85 long, 0.78 wide. All femora with one short, dorsal spine in proximal half.

Legs: measurements in Table 1.

Table 1. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	1.05	0.42	0.77	1.12	0.63	3.99
II	0.91	0.42	0.70	0.84	0.56	3.43
III	0.84	0.42	0.77	1.05	0.56	3.64
IV	1.05	0.42	0.84	1.40	0.56	4.27

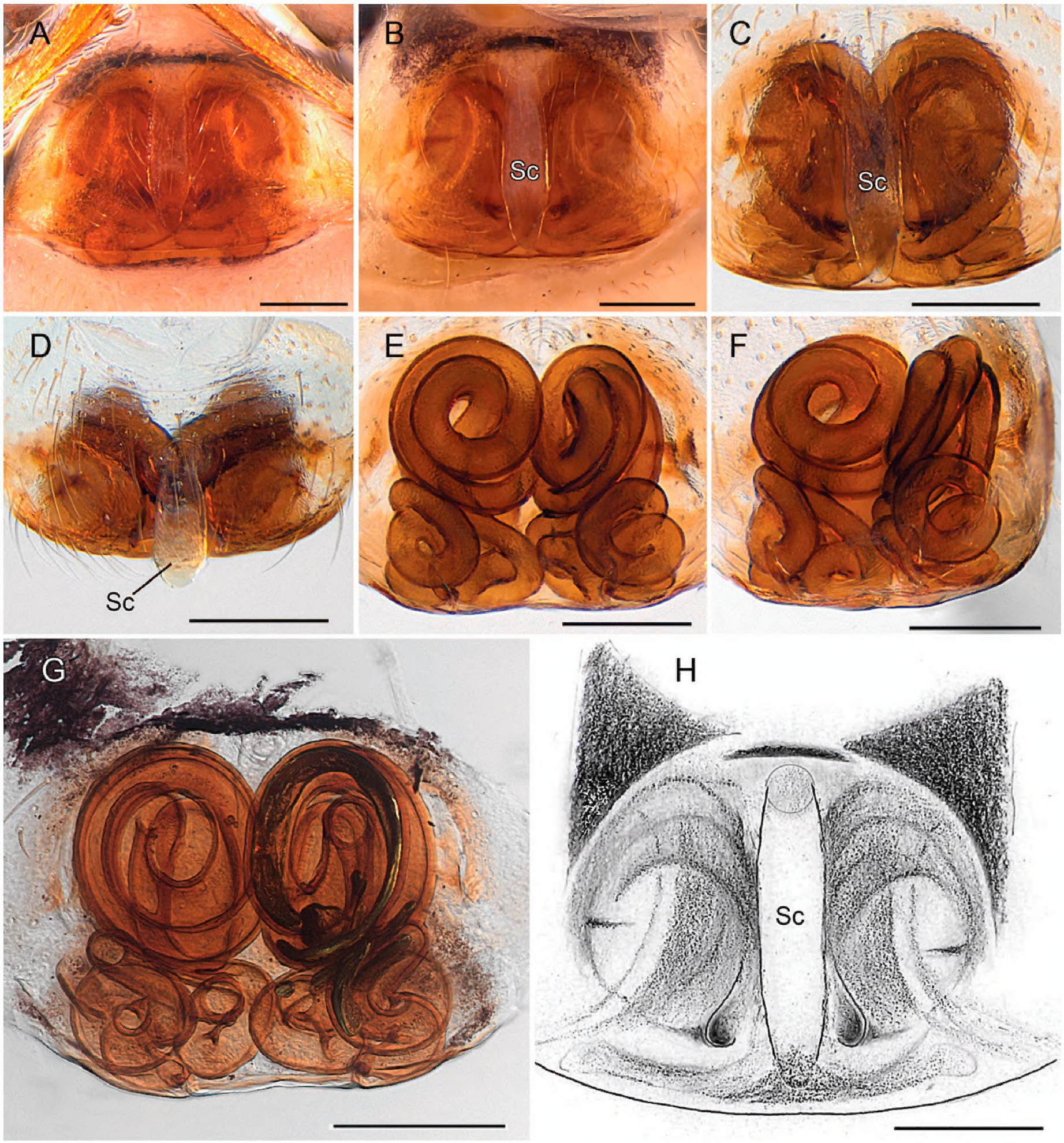

Figure 2. *Asceua arborivaga* sp. nov., female genitalia **A** holotype female **B–F, H** paratype female (RMCA_247163) **G** paratype female (RMCA_247161) **A, B** epigynes, ventral view **C** idem, cleared **D** idem, antero-ventral view **E** vulva, cleared, dorsal view **F** idem, slightly lateral **G** idem, transmitted light **H** Drawing of epigyne, ventral view. Abbreviation: Sc = scape. Scale bars: 0.2 mm.

Epigyne (Fig. 2A–H): Scape (Sc) long, narrow, with widest part in the middle, distally tapered and rounded; copulatory ducts in transparency vague, longitudinal; copulatory ducts in posterior part, mainly transverse, intricately wound, in dense, wide spirals in anterior part.

Male. Unknown.

Variation. Females (n = 2). TL 4.19–4.47, CL 1.56–1.70. White patches on abdominal dorsum may be less strongly inclined and sometimes anastomosing.

Distribution. The species is known from the Mount Nimba area in Guinea (Fig. 24).

***Asceua foordi* sp. nov.**

https://zoobank.org/9A41E803-50F3-47DF-BB89-577DF441D7A5

Figs 3–6, 24

Type material. ***Holotype*:** South Africa • ♂; Eastern Cape Province, Mazeppa Bay; 32°28.476'S, 28°38.873'E; 28.X.2006; grassy litter, *Acacia* thicket, behind dunes; C. Haddad leg; NCA 2007/206.

***Paratypes*:** South Africa • 3♂♂ 1♀; Eastern Cape Province, Mazeppa Bay, 32°28.734'S, 28°39.118'E; 28.X.2006; C. Haddad leg.; NCA 2007/219; • 1♂, Eastern Cape Province, Mazeppa Bay; 32°26.495'S, 28°36.968'E; 28.X.2006; leaf litter, *Eucalyptus* plantation; C. Haddad leg.; NCA 2007/280; • 2♀♀; Eastern Cape Province, Coffee Bay; 31°58.862'S, 29°09.119'E; 2.XI.2006; leaf litter coastal dune forest; C. Haddad leg.; NCA 2007/168; • 1♂ 3♀♀; KwaZulu-Natal, Vernon Crookes Nature Reserve; 30°16.250'S, 30°36.400'E; 486 m a.s.l.; 9–12.X.2020; Hand collecting; R. Booysen and R. Steenkamp leg.; NCA 2020/782; • 2♀♀ (DNA Z015); Eastern Cape Province, Coffee Bay; 31°59.148'S, 29°09.076'E; 5 m a.s.l.; 9.I.2011; base of grass tussocks; C. Haddad leg.; RMCA_245369; • 1♀ (drawing epigyne); Kwazulu Natal Province, Alfred District, Oribi Gorge; 30°42'S, 30°16'E; XI.1961, N. Leleup leg., RMCA_1326311; • 1♂ 3♀♀; Eastern Cape Province, Kei Mouth; 32°41'S, 28°23'E; 12.XII.2002; C. Haddad leg.; RMCA_215900; • 1♂; Kwazulu Natal Province, Krantzkloof, Krantzkloof Nature reserve; 28°51'S, 30°43'E; 25.VI.2002, forest, sieved litter; R. Jocqué leg.; RMCA_212169; • 3 juv.; as previous; winkler extraction from sieved litter; R. Jocqué leg.; RMCA_212323; • 1♂; Kwazulu Natal Province, Mtunzini; 28°57'S, 31°45'E; 26.VI.2002; coastal forest, sieved litter; R. Jocqué leg.; RMCA_212282; • 3♂♂ 1♀; Eastern Cape Province, Silaka N.R.; 31°39'S, 29°30'E; 1.XI.2011; 43 m a.s.l.; base of grasses and ferns; C. Haddad leg.; RMCA_239310; • 2♀♀; Eastern Cape Province, Port St Johns, Cremorne Estate: 31°36'S, 29°32'E; 1.X.2011; 43 m ; sifting leaf litter, coastal forest, C. Haddad leg., RMCA_239309; • 1♀; Eastern Cape Province, Coffee Bay; 31°58.862'S, 29°09.119'E; 10.I.2011; 15 m a.s.l.; sifting leaf litter coastal dune forest; C. Haddad leg.;RMCA_239312; • 2♀; Kwazulu Natal Province, Eshowe District, Dhlinza forest; 28°53'S, 31°27'E; X.1960; dans l'humus; N. Leleup leg. RMCA_132650.

Other material examined. Guinea • 1♂; Mount Nimba, Pierré Richaud; 7°39'N, 8°22'W; 10–7.X. 2011; fogging 04, top of gallery forest, open area, canopy of trees; 1625 a.s.l.; Van den Spiegel Didier, et al. RMCA_238012); DR Congo • 1♀; Parc National Salonga, 505 m a.s.l.; 2.28766S 21.02188E, 3.XII.2022, B. Pett, and M. Jocque leg. RMCA_247696; • 1♂; as previous; RMCA_247694) • 1♂; as previous; RMCA_247695.

Diagnosis. Males of this species are characterised by details of the palp (Figs 4A, B, 5A, B): the distal spine-shaped part of the dorsal tibial prong is directed forward at an angle of 90° with the base of the apophysis; the cymbium has a wide, S-shaped fold of which the distal part is particularly deep and curved upwards; females are recognized by the epigyne with scape strongly widened apically ending in the middle and the complex copulatory duct with six loops visible in transparency along its course (Figs 4C–E, 5C).

Etymology. The specific name is a patronym in honour of our friend and colleague, the late Stefan Foord, who was a dynamic arachnologist and driving force for arachnology in South Africa and beyond.

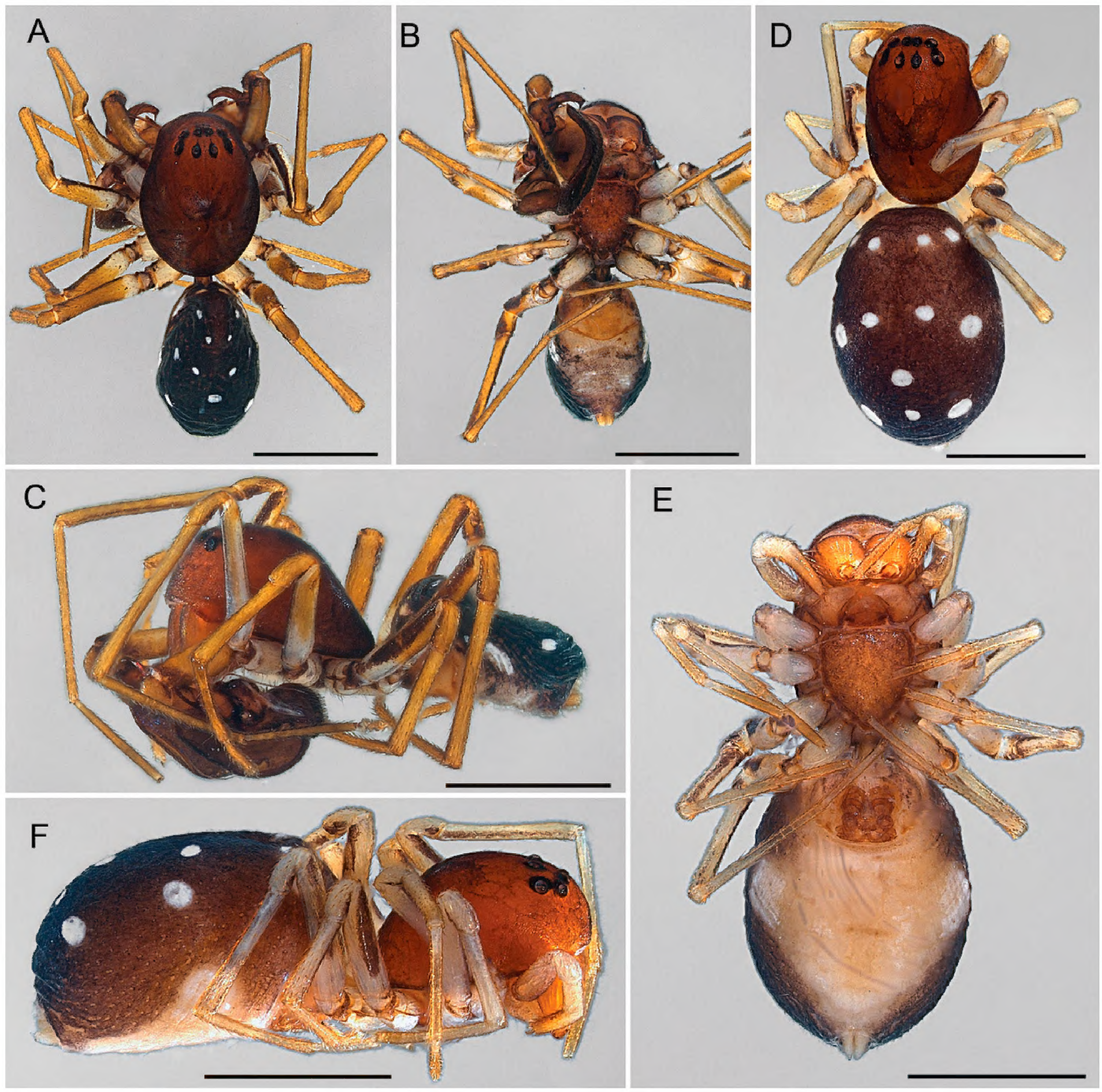

Figure 3. *Asceua foordi* sp. nov., male and female habitus **A–D** holotype male **D–F** paratype female (RMCA_132631) **A, D** dorsal view **B, E** ventral view **C, F** lateral view. Scale bars: 1 mm.

Description. Male Holotype. Figs 3A–C, 6C–E. Total body length 2.77. Colour in ethanol: carapace uniform medium brown with narrow dark rings around eyes and W-shaped dark area in front of fovea; chelicerae, endites and labium medium brown; sternum medium brown with darker margin; legs: femora pale with dark anterior stripes on Fe I–IV and dark posterior stripe on Fe III and IV in distal two thirds; abdomen: dorsum dark grey with narrow dark brown scutum in anterior half, 13 tiny white spots (Fig. x); sides dark with oblique white streak; venter pale, narrow yellowish patch in front of white spinnerets and yellow in front of epigastric fold. Carapace 1.28 long, 0.92 wide, 0.64 high. Eye sizes and interdistances: AME: 0.07; ALE: 0.08; AME–AME: 0.03; AME–ALE: 0.05; PME: 0.07: PLE: 0.10; PME–PME: 0.07; PME–PLE: 0.08. MOQ: frontal width 0.16, posterior width 0.21, length 0.24. Clypeus 0.34 high. Chilum: small triangle 0.08

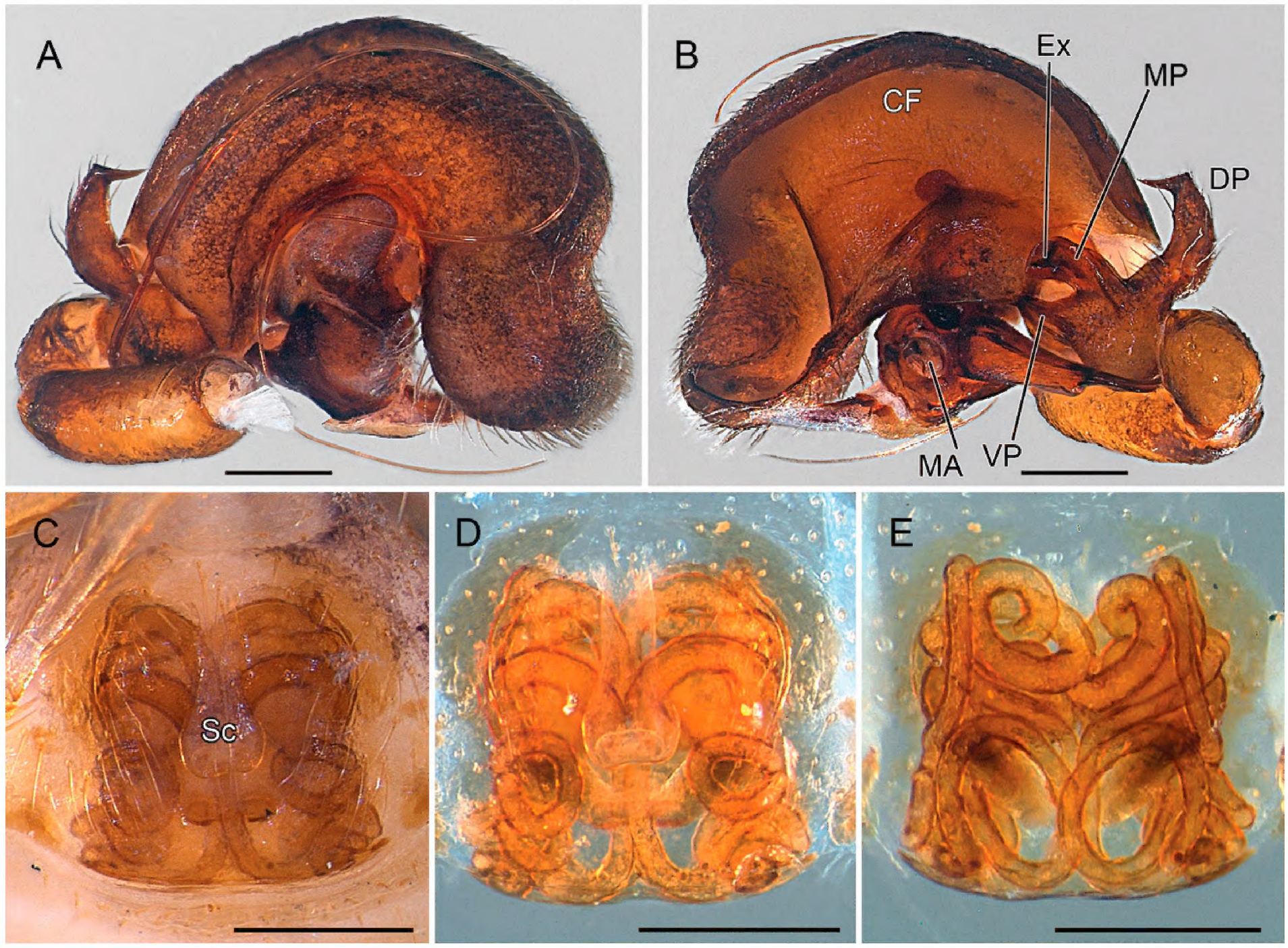

Figure 4. *Asceua foordi* sp. nov., male and female genitalia **A, B** holotype male **C–E** paratype female (RMCA_132631) **A** palp, retrolateral view **B** idem, prolateral view **C** epigyne, ventral view **D** idem, cleared **E** vulva, dorsal view. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; Ex = small prolateral extension of the median prong; MA = median apophysis; MP = median prong of palpal tibial apophysis; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm.

wide and as high. Sternum shield-shaped, 0.57 long, 0.54 wide. All femora with one short dorsal spine in proximal half.

Legs: measurements in Table 2.

Palp (Figs 4A, B, 5A, B): very large: length including Ti 0.8 times carapace length. Tibia with three apophyses: dorsal prong (DP) broad, directed up, slightly curved forward, with distal spine shaped tip pointing forward at an angle of 90°; median prong (MP) shorter, curved downward with rounded extremity, with sharp triangular extension visible by transparency (Ex); inferior one (VP) short, straight with rounded extremity; cymbium laterally compressed with large lateral S-shaped fold (CF), its distal curve deep and directed upwards; tegulum

Table 2. Male leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	1.12	0.35	1.05	1.12	0.70	4.34
II	0.91	0.35	0.70	0.91	0.56	3.43
III	0.77	0.35	0.63	0.91	0.42	3.08
IV	1.05	0.35	0.84	1.26	0.56	4.06

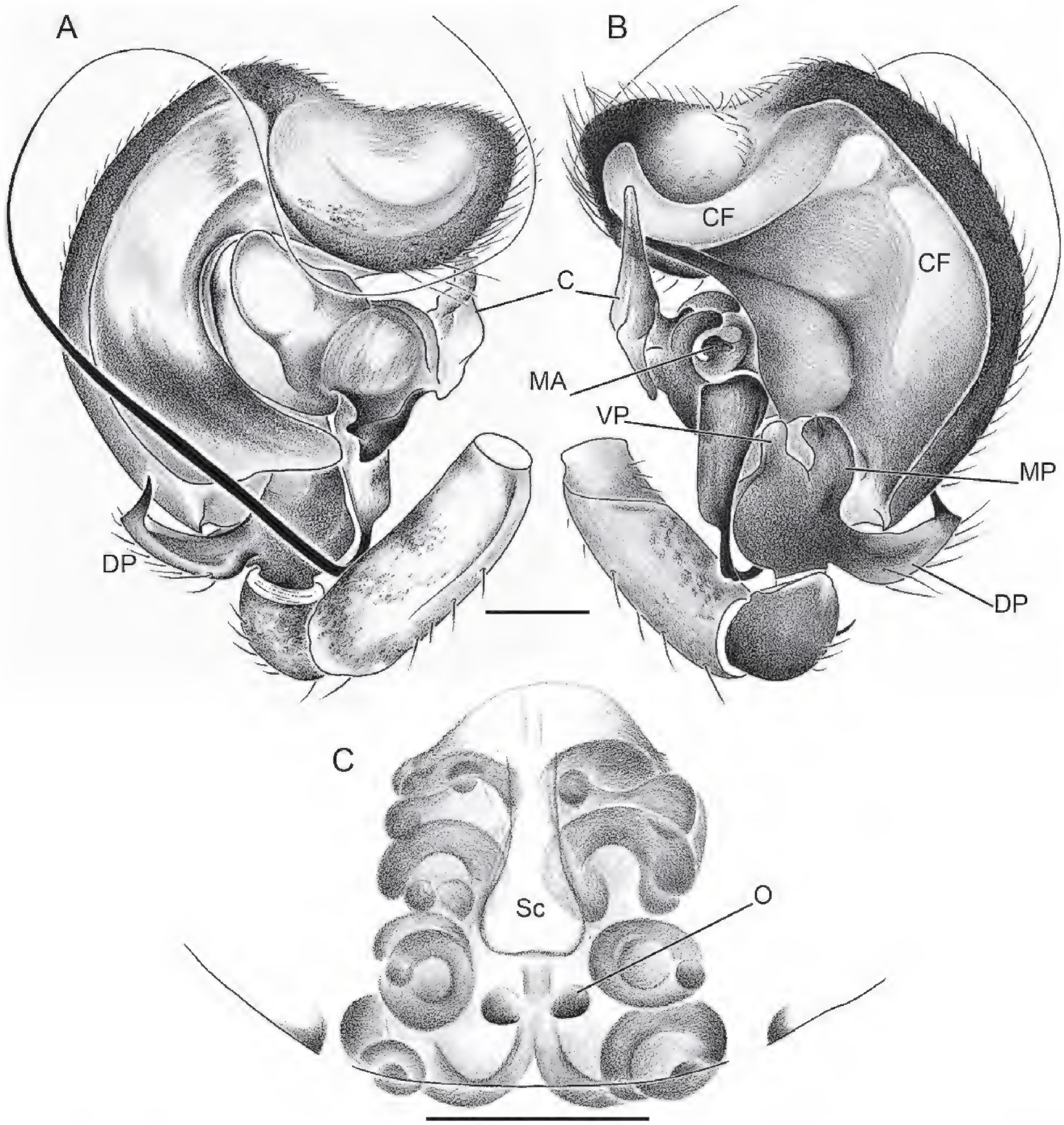

Figure 5. *Asceua foordi* sp. nov., genitalia drawings **A, B** paratype male (RMCA_212282) **C** paratype female (RMCA_132631) **A** palp, retrolateral view **B** idem, prolateral view **C** epigyne, ventral view. Abbreviations: C = conductor; CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; O = copulatory opening; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm.

with two appendages: largest one, mainly visible prolaterally; second one pear-shaped with long tapered forward directed prong; median apophysis (MA) sub-circular with short rounded lip directed forward; conductor (C) large, directed forward; embolus long and whip-shaped originating on dorsal side of tapered posterior end of roughly triangular base.

Female (paratype NCA 2007/219). Figs 3D–F, 6A, B. Total body length 3.20. Colour as in male; dorsum with 15 white spots; lateral spot rounded. Carapace 1.42 long, 0.78 wide, 0.71 high. Eye sizes and interdistances: AME: 0.07; ALE:

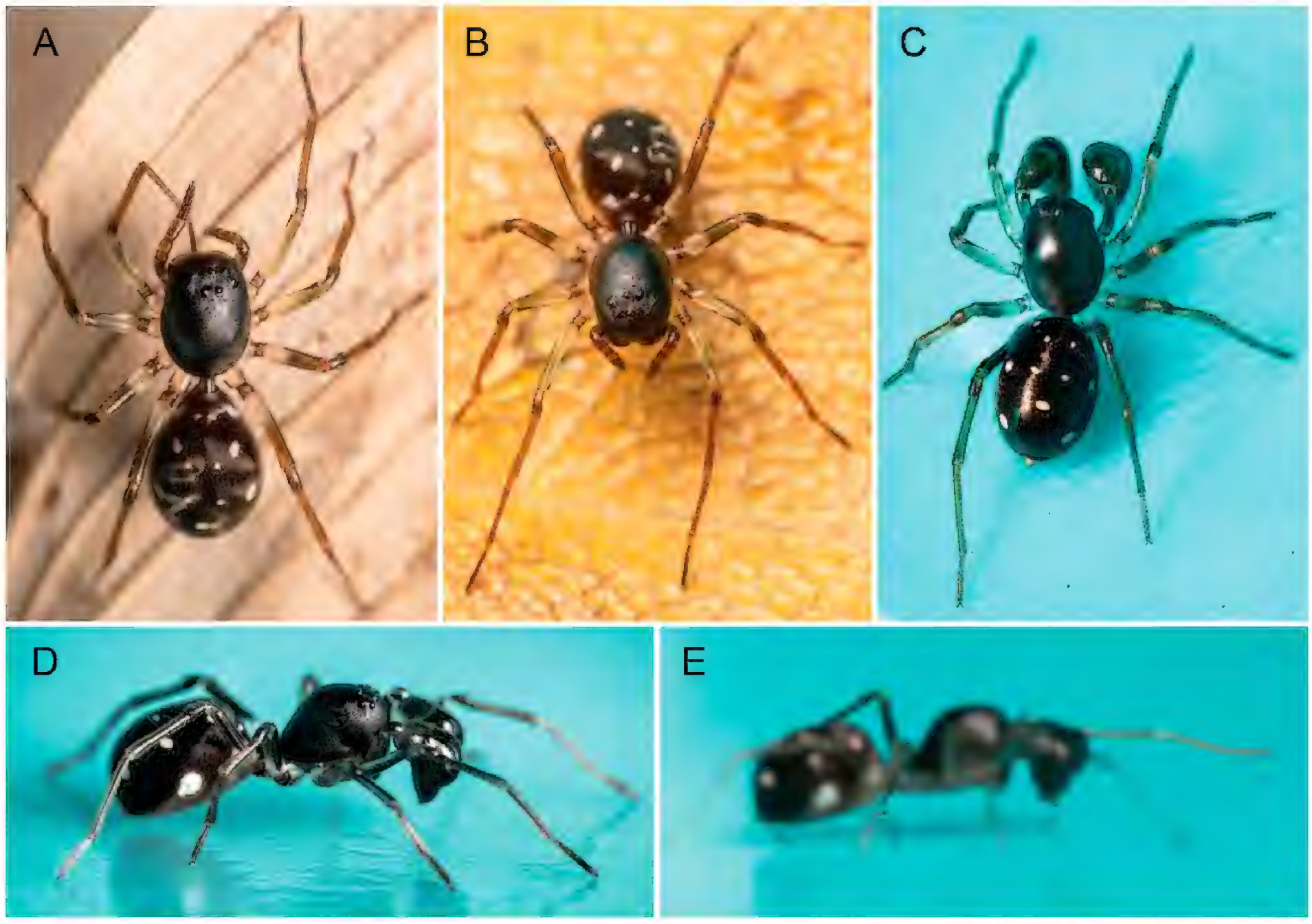

Figure 6. *Asceua foordi* sp. nov., photographs of specimens *in vivo* (NCA 2020/782) **A, B** females **C–E** male subadult. Note the ant-looking appearance in the blurred photo (E). Photos by Rudolph Steenkamp.

0.07; AME–AME: 0.03; AME–ALE: 0.07; PME: 0.07: PLE: 0.08; PME–PME: 0.07; PME–PLE: 0.10. MOQ: frontal width 0.16, posterior width 0.20, length 0.26. Clypeus 0.30 high. Chilum: small triangle 0.08 wide and as high. Sternum shield-shaped, 0.64 long, 0.57 wide. Legs without spines; measurements in Table 3.

Epigyne (Figs 4C–E, 5C): rectangular area slightly wider behind than in front; scape (Sc) widened towards posterior part situated in the centre of the epigyne, its tip slightly indented, copulatory openings (O) situated in posterior half; copulatory ducts narrow, strongly wound, with six loops visible in transparency; very complex internal structure with many loops mainly longitudinal in posterior part, mainly transverse in anterior part.

Variation. South Africa: Males (n = 5): TL 2.77–3.00, CL 1.28–1.50; white spots on dorsum 11–13. Females (n = 11): TL 2.70–3.83, CL 1.21–1.68; white spots on dorsum 13–16. The shape of the small spots may vary from circular to elongate oval.

Table 3. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.84	0.35	0.84	0.77	0.49	3.29
II	0.70	0.35	0.56	0.70	0.49	2.80
III	0.70	0.35	0.56	0.63	0.42	2.66
IV	0.91	0.35	0.70	0.98	0.49	3.43

DR Congo: Males (n = 2): TL 2.63–2.77, CL 1.35–1.42; dorsum in the centre with two transverse rectangular white spots. Female (n = 1): TL 2.51, CL 1.21; dorsum as in males. Guinea: Male (n = 1): TL 2.59; CL 1.44. Abdominal pattern as in type series.

Distribution. The species is known from South Africa, DR Congo and Guinea (Fig. 24).

***Asceua incensa* sp. nov.**

https://zoobank.org/9120A2D9-26E5-498B-8ACD-80F70FD73408

Figs 7–9, 24

Type material. ***Holotype*:** D.R. Congo • ♂; Mayombe, Luki Biosphere Reserve; 5°38'S, 13°04'E; 23.IX.2007; canopy fogging, secondary rainforest; D. De Bakker and J.P. Michiels leg; RMCA_247724.

***Paratypes*:** • 1♀; same data as holotype; RMCA_234808; • 3♂♂ 1♀; 19.IX.2007; secondary rainforest; further as previous; RMCA_235127; • 2♂♂ 1♀; 18.IX.2007; canopy fogging, secondary rainforest; further as previous; RMCA_235126.

Diagnosis. Both sexes are recognised by the wide chilum and the dark colour including the venter of the abdomen (Fig. 7B–D). Males are further characterised by the palp (Figs 8A–E, 9A, B) with stout median apophysis with pear-shaped base and claw-shaped tip, cymbial fold not strongly narrowed towards the extremity, stopping short of the cymbium tip. Females are recognised by the epigyne scape with widened tip ending at posterior half in front of copulatory openings (Figs 8F, 9C), and the genitalia with anterior loops tight and obliquely transverse (Fig. 8G, H).

Etymology. The species name is an adjective (Latin *incensus* = burnt) referring to the dark colour of the species.

Description. Male Holotype. Fig. 7A–C. TL 2.68. Colour in ethanol: carapace dark brown, cephalic area slightly paler with faint darker 'V' in front of fovea; chelicerae medium brown; endites medium brown with lateral margins darkened; labium medium brown with pale frontal margin; sternum dark brown, darker towards lateral margins; legs: coxae pale cream with narrow prolateral dark stripe; femora pale cream in proximal third, dark brown in distal two thirds; patellae, tibiae and metatarsi yellow with dark brown ventral stripe; abdomen: dorsum almost black with black scutum, on either side with small oval pale spot; sides and venter dark grey, lighter in front of epigastric fold, at its extremities with rounded white spot.

Carapace 1.32 long, 0.99 wide, 0.70 high. Eye sizes and interdistances: AME: 0.10; ALE: 0.10; AME–AME: 0.03; AME–ALE: 0.03; PME: 0.08: PLE: 0.08; PME–PME: 0.10; PME–PLE: 0.15. MOQ: frontal width 0.23, posterior width 0.26, length 0.28. Clypeus 0.34 high. Chilum: wide sclerite 0.28 wide, 0.08 high, dorsal margin procurved, ventral margin almost straight. Sternum shield-shaped, 0.71 long, 0.64 wide. All femora with one short dorsal spine in proximal half.

Legs: measurements in Table 4.

Palp (Figs 8A–E, 9A, B): large: length including Ti 0.75 times carapace length. Tibia with three apophyses: dorsal one (DP) narrow, slightly concave in prolateral view, slightly curved forward, with distal spine shaped prong smoothly following curve of basal part; median tibial apophysis (MP) parallel sided with

Table 4. Male leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.93	0.32	0.77	0.96	0.61	3.58
II	0.83	0.32	0.54	0.90	0.54	3.14
III	0.86	0.32	0.58	0.93	0.45	3.14
IV	0.96	0.32	0.70	1.12	0.54	3.65

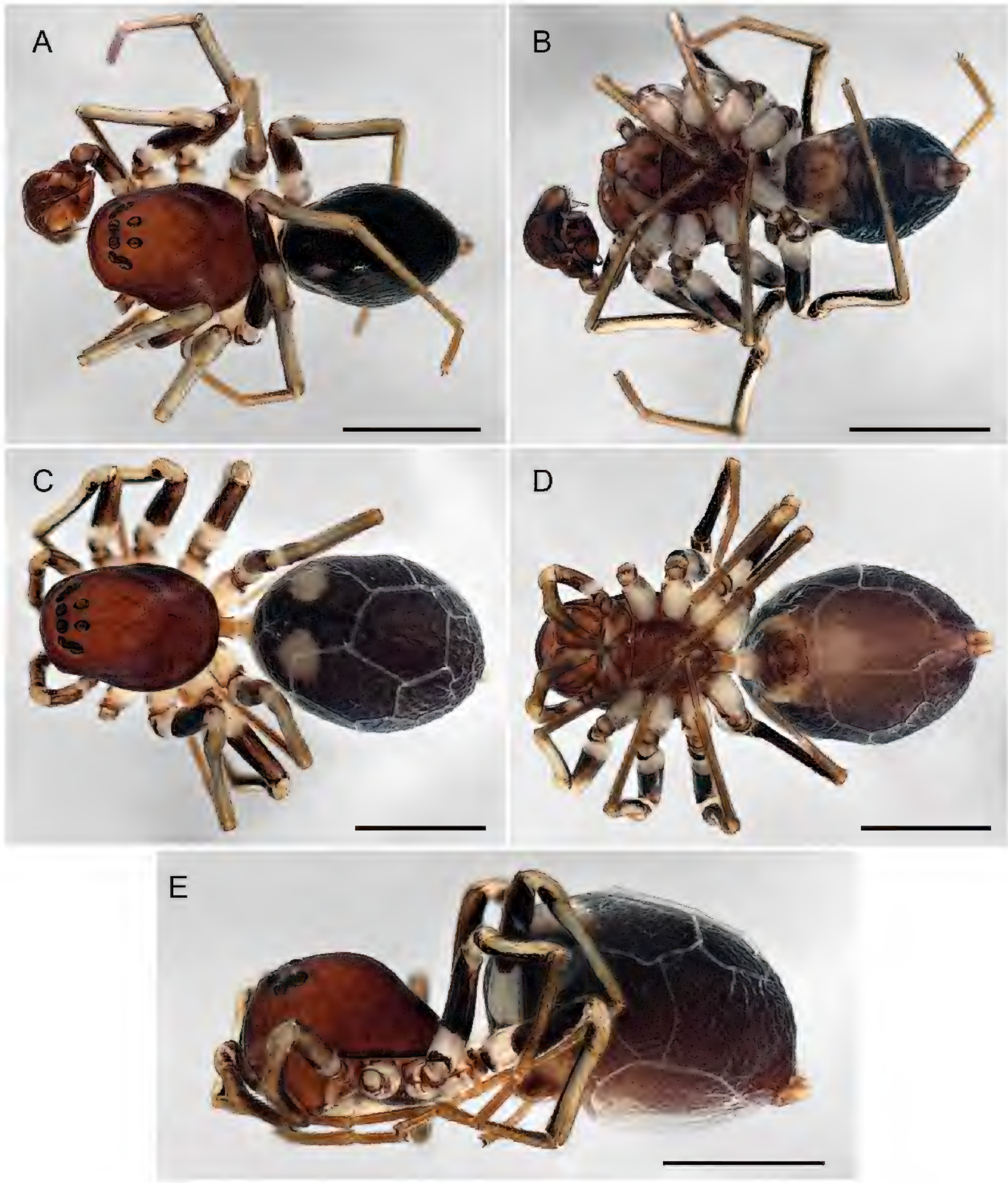

Figure 7. *Asceua incensa* sp. nov., male and female habitus **A, B** male holotype **C–E** female paratype (RMCA_234808) **A, C** dorsal view **B, D** ventral view **E** lateral view.

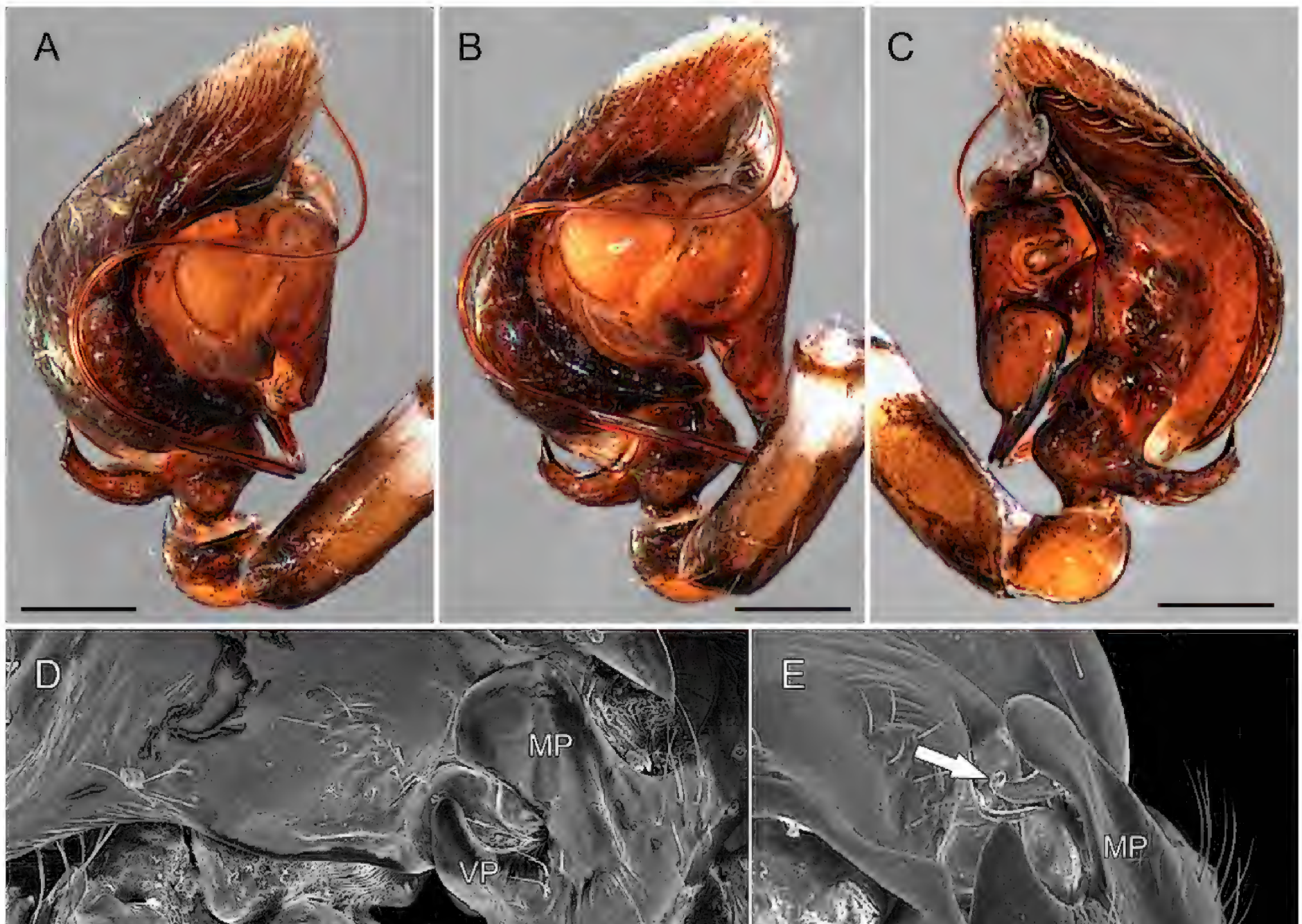

Figure 8. *Asceua incensa* sp. nov., genitalia **A–C** male holotype **D, E** male paratype (RMCA_235127) **F–H** female paratype (RMCA_234808) **A** palp, prolateral view **B** idem, slightly ventral **C** idem, retrolateral view **D** idem, SEM view, details **E** idem, detail of palpal tibial apophyses **F** epigyne, ventral view **G** idem, cleared **H** vulva, dorsal view. Abbreviations: MA = median apophysis; MP = median prong of palpal tibial apophysis; TT = tegular triangular tooth; VP = ventral prong of palpal tibial apophysis. Scales bars: 0.2 mm (**A–C**); 0.1 mm (**D–H**).

rounded extremity, with thin extension behind it (Ex); inferior one (VP) short, curved upward with rounded extremity; cymbium laterally compressed with large lateral semicircular fold, not strongly narrowed towards the extremity,

stopping short of the cymbium tip; tegulum with three appendages: largest one voluminous mainly visible prolaterally with smoothly rounded posterior tip pointing back; median apophysis (MA) pear-shaped with small tapered, rounded, upward directed prong; one extra small triangular tooth sub apically (TT); conductor membranous, directed forward; embolus long and whip shaped with large triangular base directed backward.

Female Paratype (RMCA_234808). Fig. 7D, E. TL 3.43. Colour as in male but for the absence of a scutum, pale dorsal spots larger and rounded, venter with small paler area behind epigastric fold. Carapace 1.73 long, 1.20 wide, 0.91 high. Eye sizes and interdistances: AME: 0.08; ALE: 0.08; AME–AME: 0.05; AME–ALE: 0.05; PME: 0.08: PLE: 0.08; PME–PME: 0.10; PME–PLE: 0.13. MOQ: frontal width 0.21, posterior width 0.26, length 0.30. Clypeus 0.31 high. Chilum: 0.39 wide, 0.08 high, shape as in male. Sternum shield-shaped, 0.66 long, 0.59 wide.

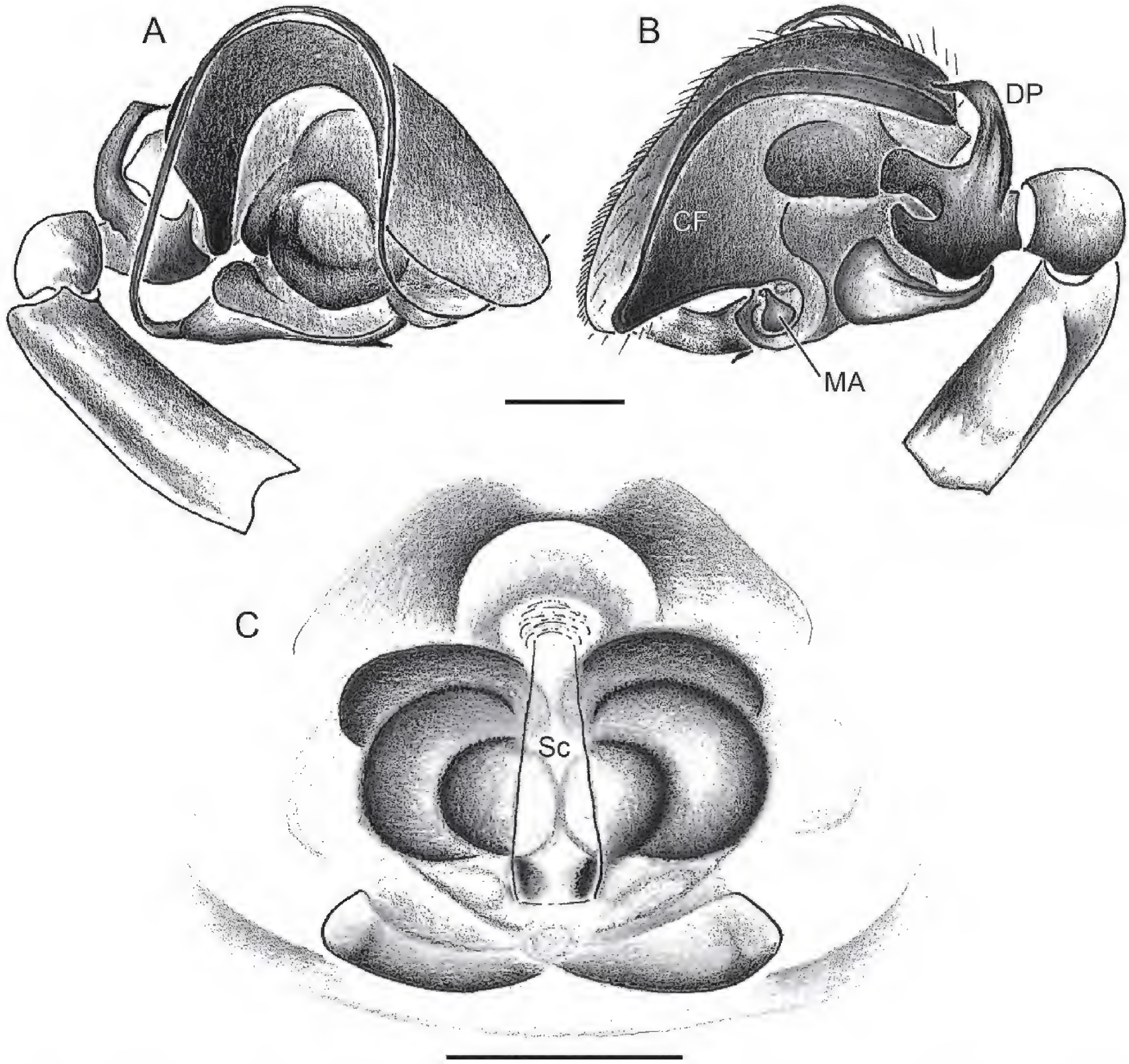

Figure 9. *Asceua incensa* sp. nov., genitalia drawings **A, B** male holotype **C** female paratype (RMCA_234808) **A** palp, retrolateral view **B** idem, prolateral view **C** epigyne, ventral view. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis MA = median prong of palpal tibial apophysis; Sc = scape. Scale bars: 0.2 mm.

Table 5. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.86	0.32	0.70	0.90	0.54	3.33
II	0.83	0.32	0.61	0.83	0.48	3.07
III	0.74	0.32	0.61	0.86	0.48	3.01
IV	0.96	0.32	0.83	1.09	0.51	3.371

Legs: All femora with one short dorsal spine in proximal half. Leg measurements in Table 5.

Epigyne (Figs 8C–E, 9C): quadrangular area, as wide as long; scape (Sc) moderately long (0.75 time epigyne height), with widened tip; copulatory openings in front of scape tip; ducts relatively wide, strongly wound, posterior part with short dense spires, anterior part with three densely superposed, obliquely transverse loops.

Variation. Males (n = 6): TL 2.68–2.94, CL 1.32–1.41; dorsum of abdomen with spots sometimes slightly larger. Females (n = 3): TL 3.43–3.84, CL 1.47–1.73; dorsum with spots sometimes slightly more oval.

Distribution. The species is known from the type locality in western DR Congo (Fig. 24).

Asceua lejeunei Jocqué, 1991

Figs 10–13, 24

Asceua lejeunei Jocqué, 1991: 41.

Type material. ***Holotype*:** D.R. Congo • ♂; Kivu-N, Ruindi, vallée de la Ruindi; 0°48'S, 29°18'E; 10.VII.1972 battage, Lejeune M. RMCA_144436).

***Paratypes*:** 4♀♀, 2. juv. together with holotype.

Other material examined. Côte d'Ivoire • 1♂; Taï forest, 5°52'N, 7°27'W; 1.IX.2010; 185 m a.s.l.; beating, D. Van den Spiegel, and A. Kablan leg.; RMCA_233436; Ethiopia: • 1♂; Yayu Coffee Forest; 8°23'N, 35°48'E; 30.XII.2003; 1476 m a.s.l.; forest, beating, N. Aklilu leg., RMCA_229444; • 1♂; Yayu Coffee Forest; 8°23'N, 35°48'E; 15.I.2004;, 1476 m a.s.l.: secondary forest, beating; N. Aklilu leg.; RMCA_229446; Ghana: • 1♀; Kakum forest; 5°20'N, 1°23'W; 14.XI.2005; primary forest; L. Baert, R. Jocqué, and D. De Bakker leg.; RMCA_217241; • 2♂♂ 1♀; as previous; RMCA_218341; • 9♂♂ 9♀♀; 18.XI.2005, further as previous RMCA_218343; • 2♂♂ 1♀; 19.XI.2005; secondary forest, further as previous; RMCA_218344; • 3♂♂; 17.XI.2005; further as previous; RMCA_218342; Guinea: • 1♂ 1♀; Mount Nimba, Forest of Gbié reserve; 7°38.707'N; 8°20.46'W; 21.XI.2017; 579 m a.s.l.; A. Henrard, D. Van den Spiegel, C. Allard, Samoura Aboubacar Mr, P. Bimou, Bamba Mr leg.; RMCA_247165; • 1♂ 1♀; Mount Nimba, Seringbara near camp 1; 7°38.975'N, 8°25.393'W; 29.XI.2017; 674 m a.s.l.: A. Henrard, D. Van den Spiegel, C. Allard, Samoura Aboubacar (Mr), P. Bimou, Bamba (Mr) leg.; RMCA_247530; • 1♀; Mount Nimba, Gouan Forest (Mid-one); 7°42'N, 8°24'W; 29.I.2012; sieving litter, secondary forest: D. Van den Spiegel et al. leg.: RMCA_238794; • 1♀: Mount Nimba, Fouenyi forest; 7°40'N, 8°28'W; 1.III.2012, 573 m a.s.l.: sieving litter under trees; M. Sidibé, A. Henrard, C. Allard,

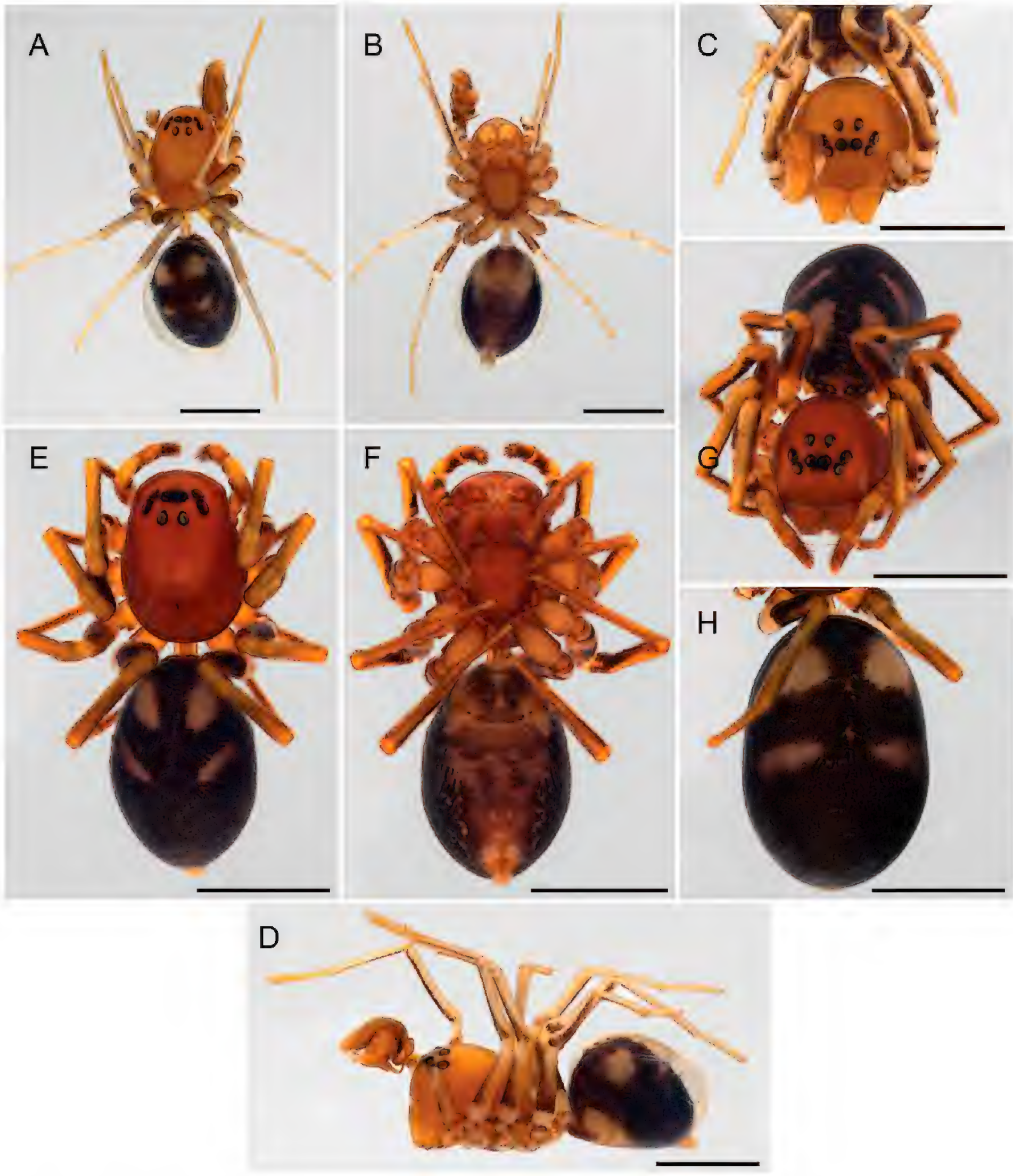

Figure 10. *Asceua lejeunei* Jocqué, 1991, male and female habitus **A–D** holotype male **E–H** paratype female (RMCA_144436) **A, E** dorsal view **B, F** ventral view **C, G** frontal view **D** lateral view **H** abdomen, dorsal view. Scale bars: 1 mm.

P. Bimou leg.; RMCA_239733; • 1♀; Mount Nimba, Freton, Seringbara; 7°38'N, 8°27'W; 2.III.2012, 586 m a.s.l.; sieving humid litter, primary forest; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_239254; • 1♀; Mount Nimba, Gbié forest, Deguelou; 7°40'N, 8°19'W; 18.III.2012; 595 m a.s.l.; sieving soil litter, near river Deguelou; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_239141; • 2♂♂

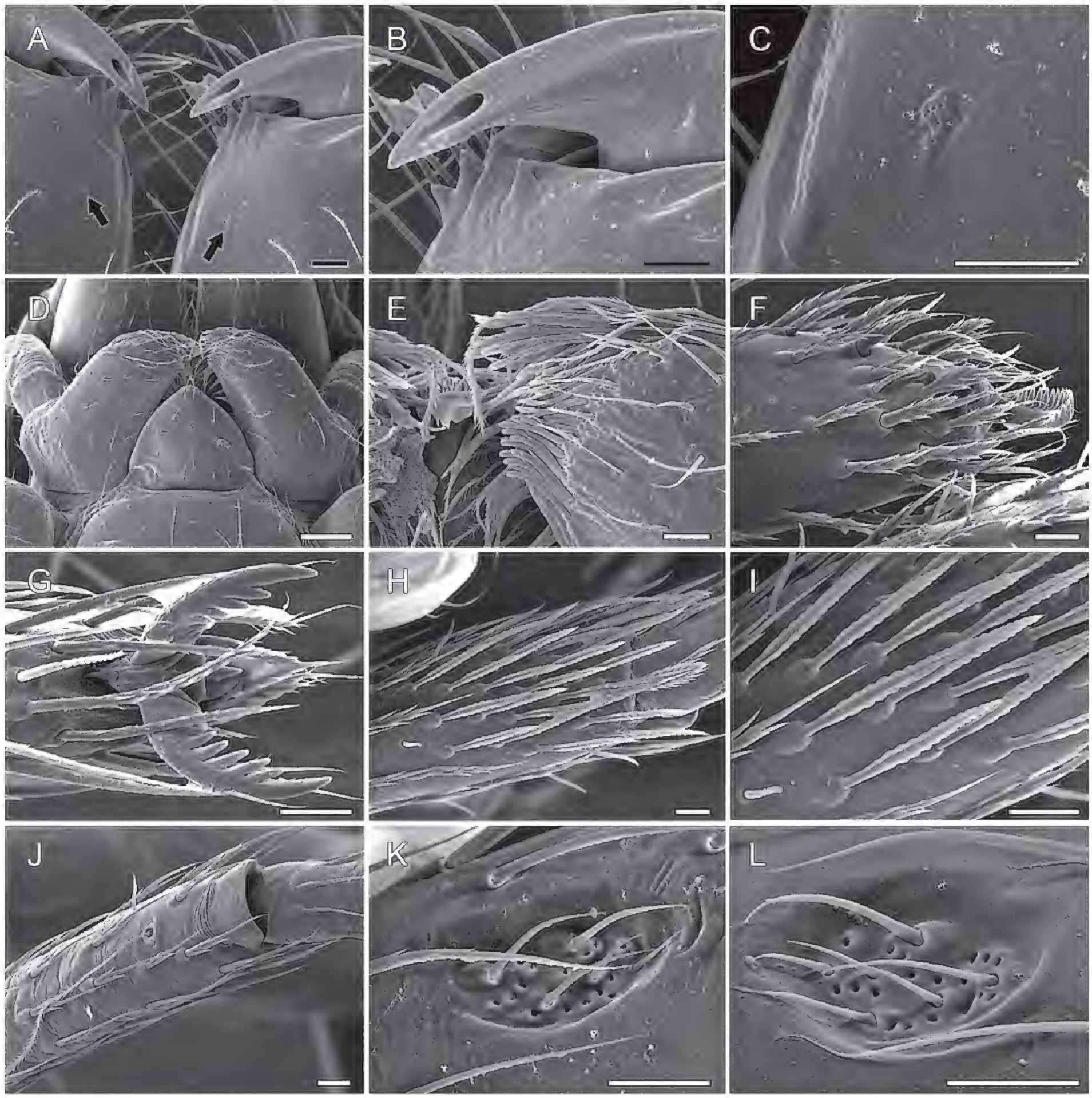

Figure 11. *Asceua lejeunei* Jocqué, 1991, SEM views of somatic characters, female (RMCA_ 245370) **A** cheliceral fangs and promargins, ventral view. Arrows pointing to cheliceral pores **B** idem, detail of fang and promargin teeth **C** detail of cheliceral pores on proventral face **D** endites and labium, ventral view **E** apex of endites, detail of setae **F** apex of palpal tarsus, ventral view **G** claws of leg IV **H** apex of metatarsus III, ventral view **I** idem, detail of chisel-shaped setae **J** apex of metatarsus IV **K** Femoral organ of leg I, retrolateral side **L** idem, prolateral side. Scale bars: 20 µm (**A–C, E–L**); 0.1 mm (**D**).

1♀; Mount Nimba, Seringbara Forest; 7°39'N, 8°26'W; 13.III.2012; 606 m a.s.l.; fogging, secondary forest, canopy, no wind; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_239640; • 2♀♀; Mount Nimba, Fouenyi Forest; 7°40'N, 8°28'W; 1.III.2012; 573 m a.s.l.; sieving soil litter; Sidibé M., A. Henrard, C. Allard, P. Bimou leg.; RMCA_238797; • 1♂; Mount Nimba, Forêt Gouan (Mid-one), 7°42'N, 8°24'W, 8.X.2011, sieving litter, secondary forest, A. Henrard, D. Van den Spiegel leg. RMCA_245370; • 2♂♂; Mount Nimba, Gouan forest (Mid-one) 7°42'N, 8°24'W, 8.X.2011, beating, litter in trees and shrubs, at 1.5–3 m above the floor, A. Henrard and Van den Spiegel leg.; RMCA_247162; • 1♂; Mount Nimba, Gouan For-

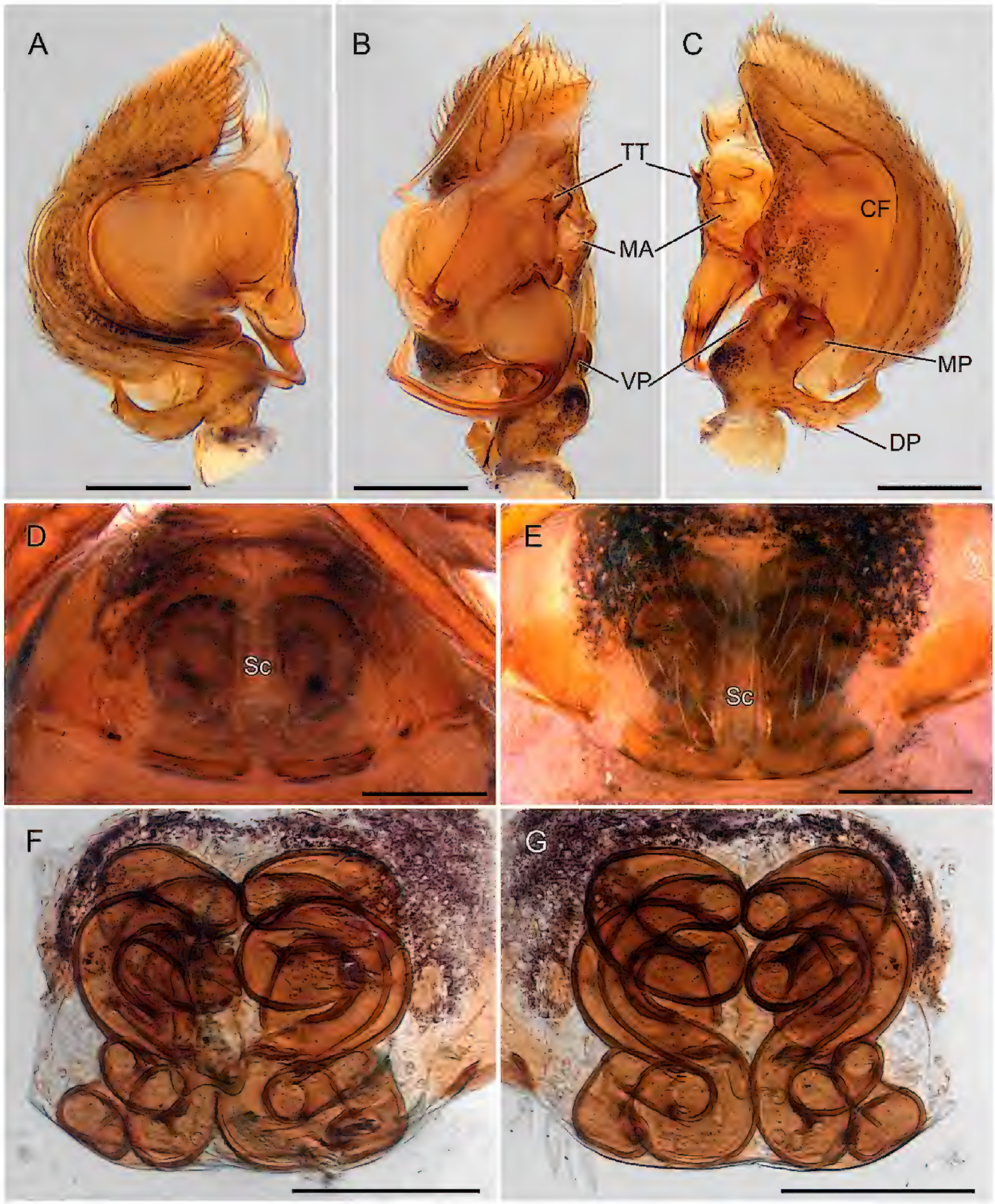

Figure 12. *Asceua lejeunei* Jocqué, 1991, male and female genitalia **A–C** holotype male **D–G** paratype females (RMCA_144436) **A** palp, prolateral view **B** idem, ventral view **C** idem, retrolateral view **D** epigyne, ventral view **E** idem, another female **F** idem, cleared **G** vulva, dorsal view. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; Sc = scape; TT = tegular tooth; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm.

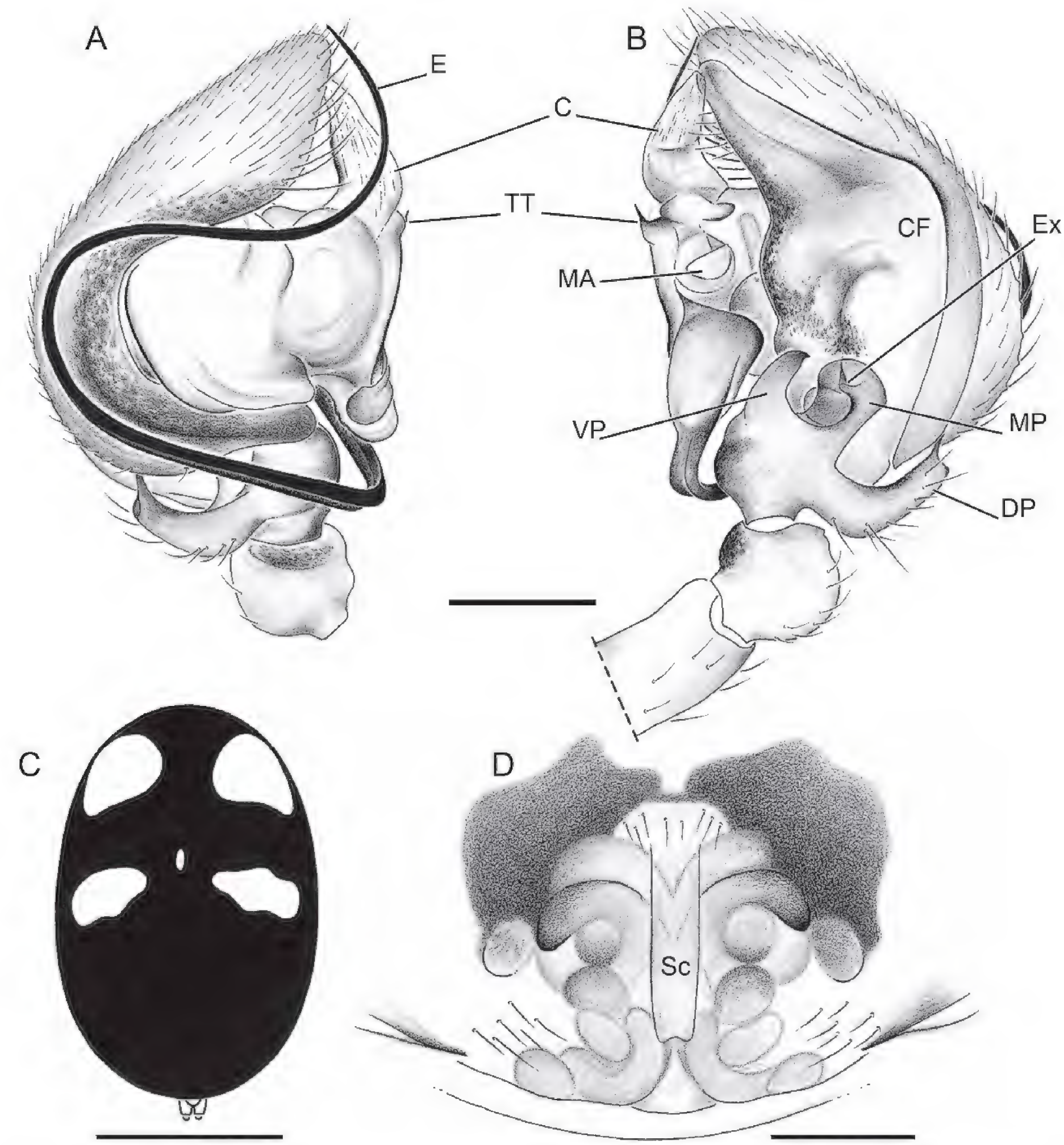

Figure 13. *Asceua lejeunei* Jocqué, 1991, drawings **A, B** holotype male **C, D** paratype females (RMCA_144436) **A** palp, prolateral view **B** idem, retrolateral view **C** female abdomen, dorsal view **D** epigyne, ventral view. Abbreviations: C = conductor; CF = cymbial fold; E = embolus; Ex = small prolateral extension of the median prong; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; TT = tegular tooth; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm (**A, B, D**); 1 mm (**C**).

est (Mid-one); 7°42'3"N, 8°23'5"W; 8.X.2011; beating, litter in trees and shrubs, at 1.5–3 m above the floor, D. Van den Spiegel, A. Henrard leg.; RMCA_245358; • 1♂; Mount Nimba, Seringbara Forest; 7°39'N, 8°26'E; 12.III.2012; 584 m a.s.l.; canopy fogging; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_239747;

• 1♂: Mount Nimba, Seringbara Forest; 7°39'N, 8°26'W; 13.III.2012; 606 m a.s.l.: fogging, secondary forest, canopy fogging, no wind; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_239602; • 1♂; Mount Nimba, Seringbara parking; 7°38'N, 8°27'W; 2.III.2012; 586 m a.s.l.: sieving soil litter, primary forest; M. Sidibé, A. Henrard, C. Allard, P. Bimou leg.; RMCA_238681; • 1♂; Mount Nimba, Middle valley of Zougué, near Gbakoré mine camp; 7°42'N, 8°24'W; 5.X.2011; Fogging 3, secondary gallery forest, canopy fogging; D. Van den Spiegel and A. Henrard leg.; RMCA_238943; Nigeria: • 1♀; Western, Ibadan, Ibadan, IITA; 7°14'N, 3°30'E; 22–29.V.1981; pitfall 5, secondary forest; A. Russell-Smith leg.; RMCA_235840.

Diagnosis. Males of this species are recognised by the cymbium without retrobasal button like process (Fig. 12C), by the dorsal prong of palpal tibial apophysis parallel-sided up to distal tip (Figs 12C, 13 B) and by the well-developed tegular subdistal tooth visible from both sides (Fig. 13A, B). Females are characterised by the epigyne scape with parallel sides, indented at posterior tip and reaching 0.75 of epigyne length.

Description. For description, see Jocqué (1991: 41).

Distribution. Known from areas across the African continent, from Ethiopia in the east, to Guinea in the west (Fig. 24).

***Asceua luki* sp. nov.**

https://zoobank.org/AE640F71-ECEF-45E5-9009-4FF508F86CE0

Figs 14–16, 24

Type material. ***Holotype*:** D.R. Congo • ♂: Bas-Congo, Mayombe, Luki Biosphere Reserve; 5°38'S, 13°04'E; 22.IX.2007; canopy fogging, secondary rainforest; D. De Bakker, and J.P. Michiels leg.; RMCA_247723. ***Paratypes*:** • 4♂♂ 3♀; as holotype; RMCA_235130; • 1♂ 1♀; 21.IX.2007; further as holotype; RMCA_235129; • 3♂♂ 1♀; 20.IX.2007; further as previous; RMCA_235128.

Diagnosis. Males and females of this species differ from those of *A. incensa* by the pale venter of the abdomen (Fig. 14C, F) and the triangular shape, as wide as high, of the chilum. In the male palp of *A. luki* the cymbial fold reaches the very tip of the cymbium and is strongly narrowed at the extremity (Figs 15B, C, 16B), but it does not in *A. incensa* (Figs 8C, 9B). In addition, the palp of *A. luki* is similar to that of *A. lejeunei* but differs by some details: in *A. luki*, the median prong of the tibial apophysis is provided with a prolateral triangular tooth visible in transparency (Fig. 15D, E); in *A. lejeunei* the tooth on the slightly wider median prong of the tibial apophysis is thinner and curved (Figs 12C, 13B). Females are recognised by the structure of the epigyne similar to that of *A. palustris*: in *A. luki* the scapus is longer and narrower and not strongly widened at the posterior tip, and the copulatory openings are in front of the scapus tip, whereas behind it in *A. palustris* (Figs 15F, 16C *vs*. Fig. 17D, G); the posterior copulatory ducts are large and tightly wound, in *A. luki* they are narrower, loosely wound and crossing at the start in *A. palustris* (Fig. 15G, H *vs*. Fig. 17E, F). Females of *A. luki* differ from *A. lejeunei* by the scape, which is not indented (Fig. 16C *vs*. Fig. 13D).

Etymology. The species name is a noun in apposition taken from the type locality.

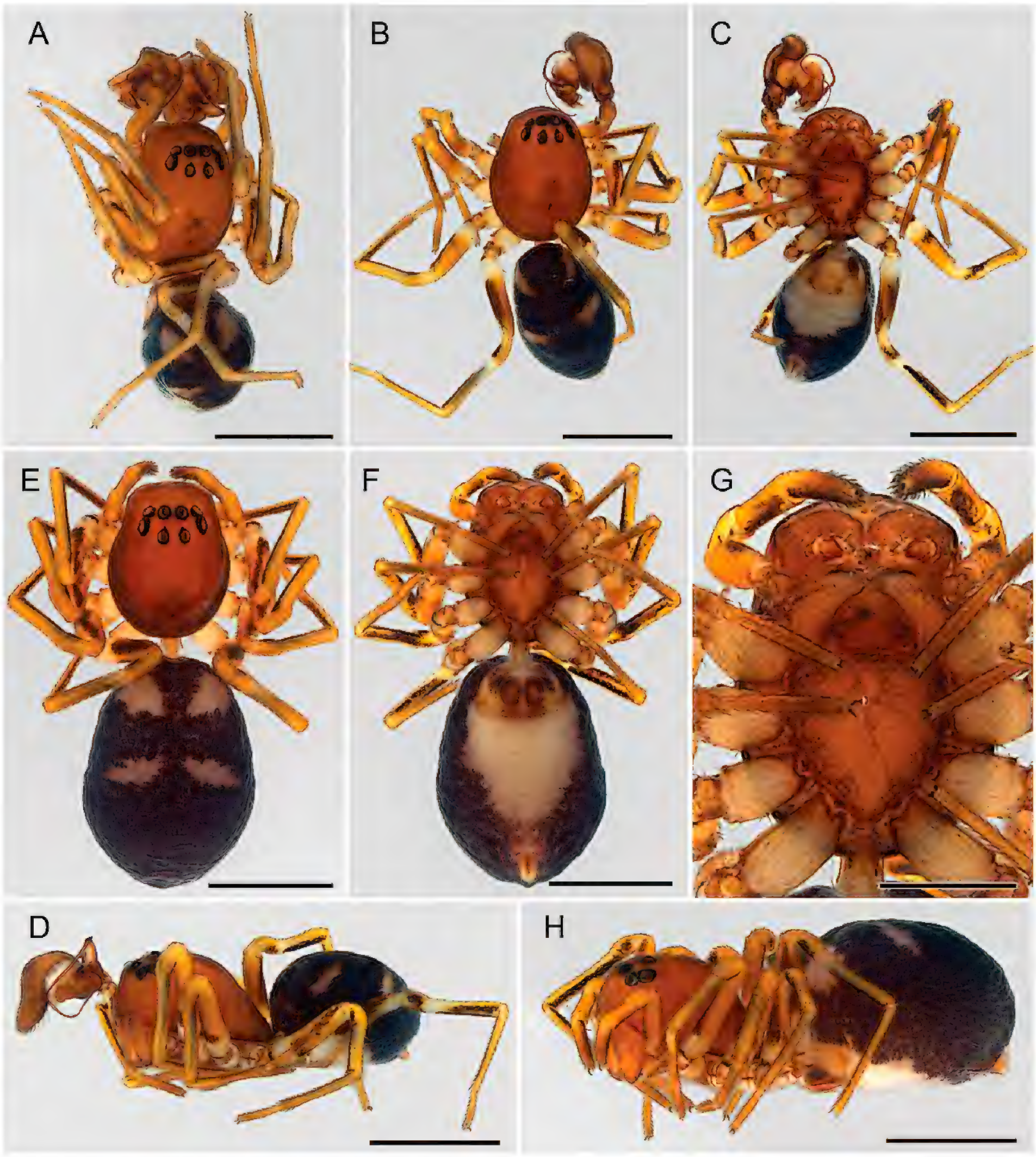

Figure 14. *Asceua luki* sp. nov., male and female habitus **A** holotype male **B–D** paratype male (RMCA_235130) **E–H** paratype female (RMCA_ 235130). **A, B, E.** dorsal view. **C, F, G.** ventral view **D, H** lateral view. Scale bars: 1 mm.

Description. Male Holotype. Fig. 14A–D. Total body length 2.68. Colour in ethanol: carapace brownish orange, with faint darker 'X' in front of fovea, dark rings around eyes and dark clypeus; chelicerae pale brown; endites and labium medium brown with pale frontal margin; sternum yellowish brown with darker margins; legs: femora proximal third of Fe white, distal 2/3 yellow with dark prolateral stripe and extra retrolateral stripe on Fe IV; remainder of legs yellow with dark ventral stripe on patellae, tibiae and metatarsi; abdomen: dorsum sepia with transparent brown scutum, two longitudinal, oval pale spots in anterior

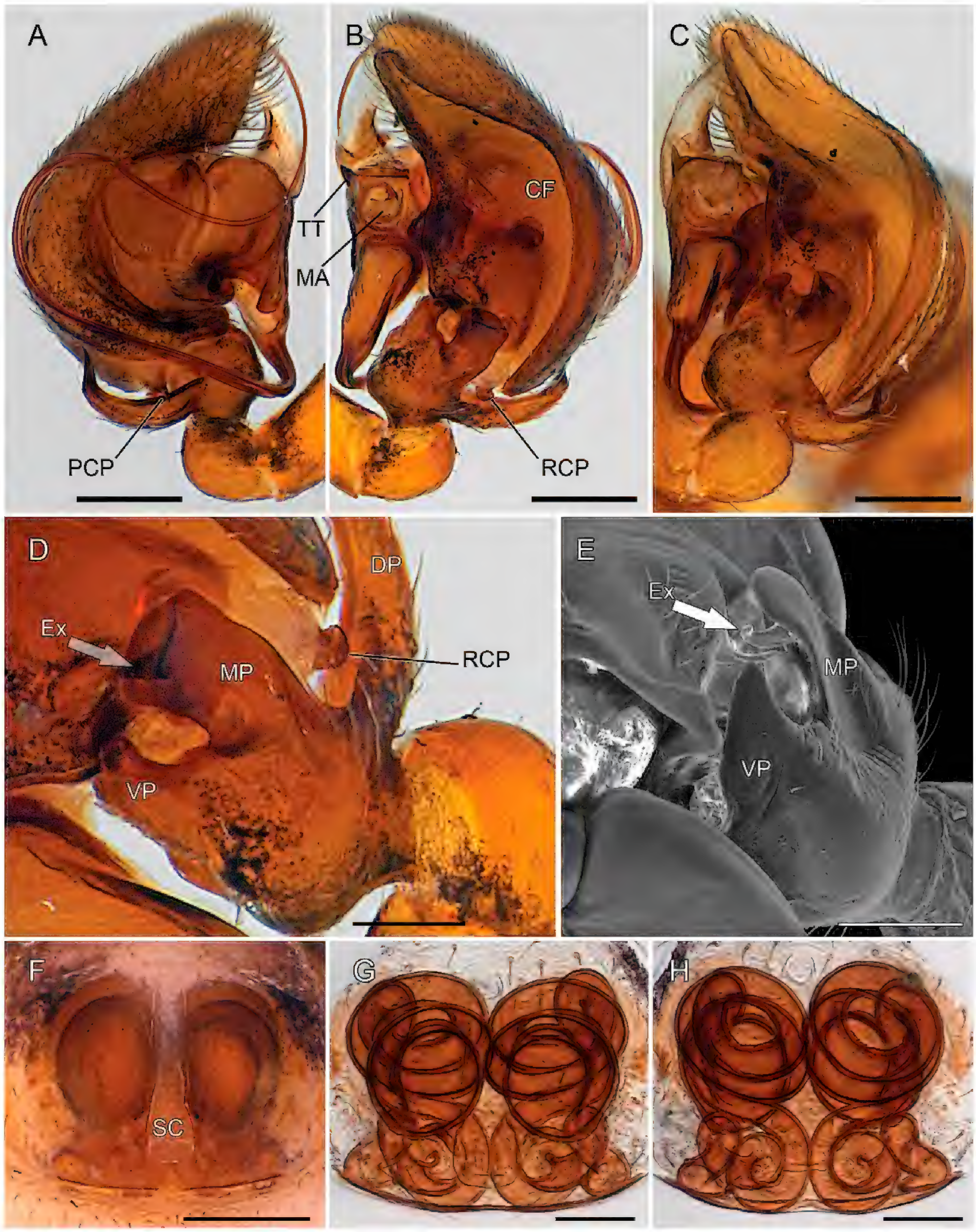

Figure 15. *Asceua luki* sp. nov., male and female genitalia **A, B** paratype male (RMCA_235130) **C** holotype male **D–F** paratype female (RMCA_235130) **A** palp, prolateral view **B, C** idem, retrolateral view **D** detail of the palpal tibial apophyses **E** idem, SEM view **F** epigyne, ventral view **G** idem, cleared **H** vulva, dorsal view. The arrows point to Ex. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; Ex = small prolateral extension of the median prong; MA = median apophysis; MP = median prong of palpal tibial apophysis; PCP = probasal cymbial process; RCP = retrobasal cymbial process; TT = tegular tooth; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm (**A, B, F**); 0.1 mm (**D, E, G, H**).

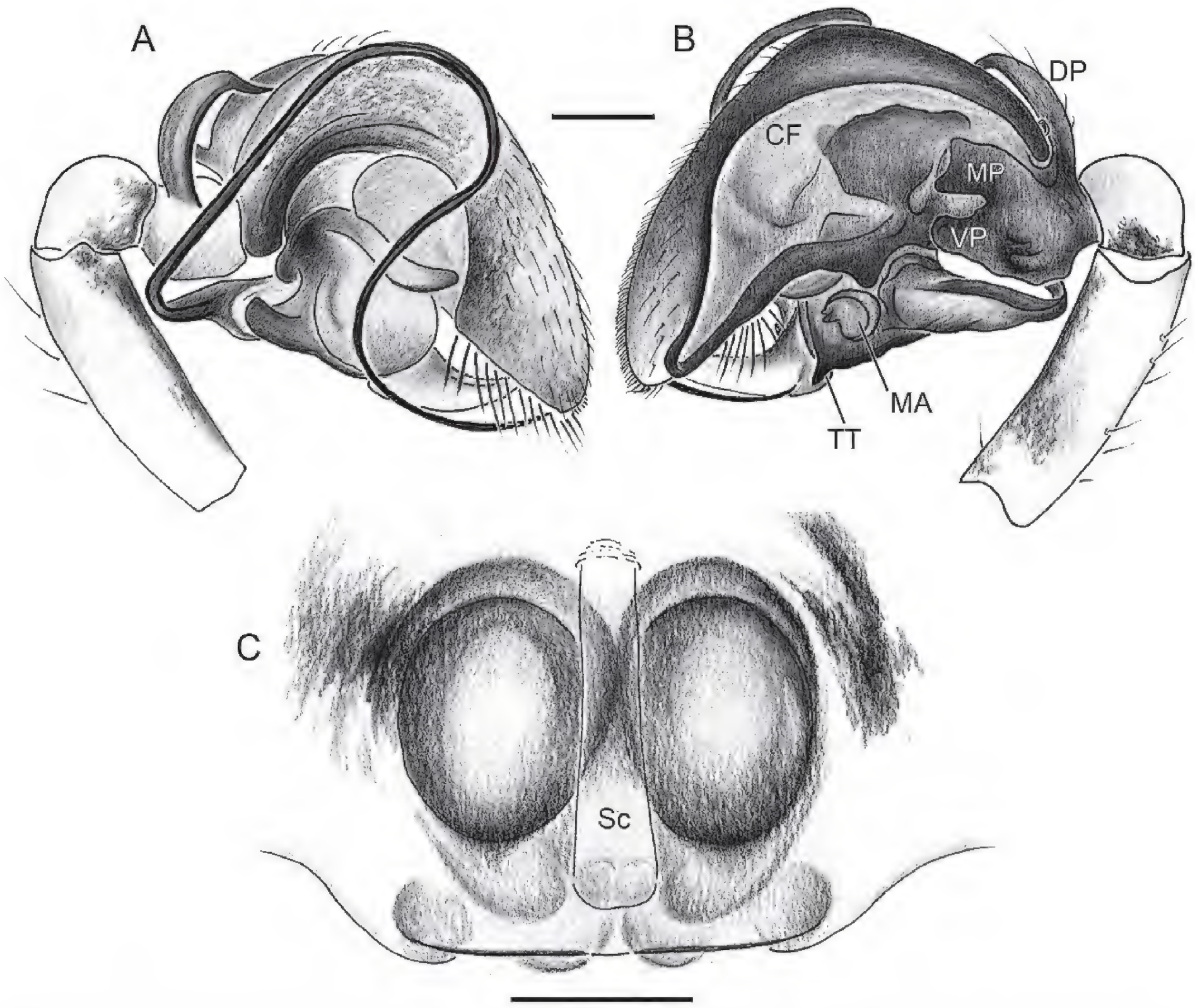

Figure 16. *Asceua luki* sp. nov., drawings **A, B** paratype male (RMCA_235130) **C** paratype female (RMCA_235130) **A** palp, retrolateral view **B** idem, prolateral view **C** epigyne, ventral view. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.1 mm.

half and two transverse oval spots in the middle; sides dark as dorsum; venter pale in anterior 2/3; spinnerets yellow surrounded by dark area continuing from dorsum. Carapace 1.32 long, 0.99 wide, 0.92 high. Eye sizes and interdistances: AME: 0.09; ALE: 0.10; AME–AME: 0.07; AME–ALE: 0.02; PME: 0.10: PLE: 0.12; PME–PME: 0.07; PME–PLE: 0.11. MOQ: frontal width 0.25, posterior width 0.26, length 0.28. Clypeus 0.30 high. Chilum: triangular poorly defined sclerite 0.07 wide and as high. Sternum shield-shaped, 0.64 long, 0.61 wide. Legs: all femora with one short dorsal spine in proximal half; ; measurements in Table 6.

Palp (Figs 15A–C, 16A, B): large: length including Ti 0.61 times carapace length. Tibia with three apophyses: dorsal prong (DP) wide, concave in prolateral view, curved forward, with distal, spine-shaped prong pointing forward at an angle of 45°, inserted on apophysis tip; median prong (MD) roughly square with prolateral tooth (Ex); ventral prong (VP) short, straight with rounded extremity; cymbium laterally compressed with large retrolateral semicircular fold (CF), strongly narrowed at extremity reaching cymbial tip, with small, retrobasal button-like process (RCP) fitting DP concavity and sharp conical prolateral

Table 6. Male leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.86	0.32	0.70	0.80	0.54	3.23
II	0.80	0.32	0.64	0.70	0.48	2.94
III	0.70	0.32	0.51	0.77	0.48	2.78
IV	0.83	0.32	0.67	0.96	0.51	3.30

Table 7. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.83	0.32	0.64	0.83	0.48	3.10
II	0.77	0.32	0.61	0.77	0.48	2.94
III	0.83	0.32	0.54	0.83	0.45	2.98
IV	0.96	0.32	0.70	1.06	0.38	3.42

extension (PCP); tegulum with ventral part provided with small tooth (TT) anteriorly; median apophysis (MA) rounded and concave opening towards the front; embolus long and whip shaped, its base smoothly tapered in retrolateral view, a broad triangle in ventral view.

Female Paratype (RMCA_235130). Fig. 14E–H. Total body length 3.43. Colour as in male but for the absence of a scutum, pale dorsal spots larger and rounded, venter with smaller paler area behind epigastric fold. Carapace 1.73 long, 1.20 wide, 0.91 high. Eye sizes and interdistances: AME: 0.09; ALE: 0.10; AME–AME: 0.05; AME–ALE: 0.05; PME: 0.10: PLE: 0.10; PME–PME: 0.07; PME–PLE: 0.12. MOQ: frontal width 0.23, posterior width 0.26, length 0.31. Clypeus 0.28 high. Chilum: triangular, 0.10 wide and as high; shape as in male. Sternum shield-shaped, 0.67 long, 0.58 wide. Legs: all femora with one short dorsal spine in proximal half; measurements in Table 7.

Epigyne (Figs 15F–H, 16C): quadrangular area, as wide as long; scape (Sc) long, slightly narrower in anterior half, clearly widened at tip; copulatory openings in front of scape tip; ducts relatively wide, strongly wound, posterior part a short dense spire, anterior part with three densely superposed loops.

Variation. Males (n = 8): TL 2.16–2.77; CL 1.28–1.73; white spots on dorsum sometimes narrower. Females (n = 4): TL 2.92–3.43, CL 1.21–1.68; white spots on dorsum wide.

Distribution. The species is known from the type locality in western DR Congo (Fig. 24).

***Asceua palustris* sp. nov.**

https://zoobank.org/2D09FE33-F891-4DE6-8B10-21DC2048E6B9

Figs 17, 24

Type material. ***Holotype*** D.R. Congo • ♀; Kwango. territoire de Feshi. rive gauche de la Kwenge; 4°50'S, 18°54'E; 840 m a.s.l.; IV.1959; îlot de forêt marécageux inondée; J. Leleup leg.; RMCA_113670. ***Paratype*:** • 1♀; II.1959; further as Ht; RMCA_113489.

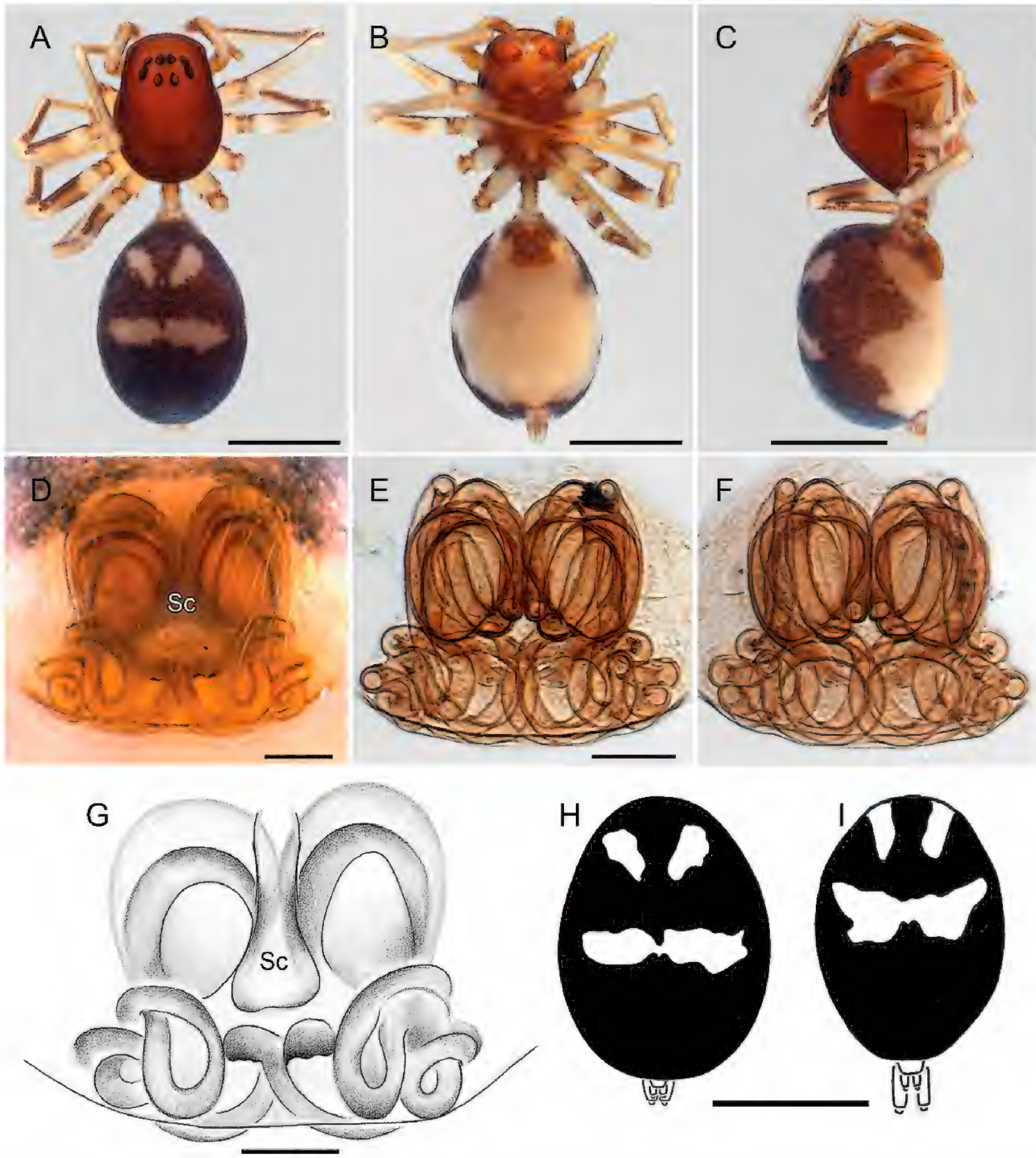

Figure 17. *Asceua palustris* sp. nov. **A–D, G, H** holotype female (RMCA_113670). **E, F, I.** paratype female (RMCA_113489) **A** habitus, dorsal view **B** idem, ventral view **C** idem, lateral view **D, G** epigyne, ventral view **E** idem, cleared **F** vulva, dorsal view **H, I** abdomen, dorsal view. Abbreviations: Sc = scape. Scale bars: 1 mm (**A–C, H, I**); 0.1 mm (**D–G**).

Other material examined. D.R. Congo • 1♀; Kivu-N., Visiki, forêt de Visiki; 0°12'N, 29°15'E ; 23.XII.1971; M. Lejeune leg. ;RMCA_140837; • 1 subadult ♂: Kwango, Feshi, tête de source de la Mvula myeji, rive gauche de la Kwenge; 4°50'S 18°54'E; 840 m a.s.l.; III.1959; forêt de terre ferme; J. Leleup leg.; RMCA_113520; 1 subadult ♂: as previous ; RMCA_113523.

Diagnosis. Females of this species are recognised by the ventral aspect of the epigyne with two central smooth areas, surrounded by loops of the copu-

Table 8. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	total
I	0.92	0.28	0.69	0.89	0.66	3.43
II	0.87	0.31	0.61	0.74	0.52	3.05
III	0.52	0.28	0.66	0.84	0.62	2.92
IV	0.90	0.28	0.79	0.98	0.62	3.58

latory ducts visible in transparency; the crossing of the copulatory ducts at the beginning is unique in the Afrotropical species; the dorsum of the abdomen is provided with two pairs of spots.

Etymology. The specific name refers to the type of habitat.

Description. Female Holotype. Fig. 17A–C, H, I. Total body length 3.52. Colour in ethanol: carapace and chelicerae uniform medium brown with narrow dark rings around eyes; endites and labium medium brown with pale anterior margin; sternum medium brown with pale central longitudinal triangle in posterior half; legs pale with narrow, pro- and retrolateral dark stripes; dorsum of abdomen dark sepia with sinuous margin on sides, provided with two oblique pale triangles in anterior half and two transverse rectangular spots, touching in the middle; venter pale, spinnerets pale yellow. Carapace 1.52 long, 0.96 wide, 0.60 high. Eye sizes and interdistances: AME: 0.07; ALE: 0.08; AME–AME: 0.05; AME–ALE: 0.02; PME: 0.07: PLE: 0.13; PME–PME: 0.08; PME–PLE: 0.07. MOQ: frontal width 0.18, posterior width 0.23, length 0.26. Clypeus 0.33 high. Chilum: small triangle 0.10 wide and as high. Sternum shield-shaped, 0.72 long, 0.60 wide. Spination: all femora with short proximal dorsal spine; measurements in Table 8.

Epigyne (Fig. 17D–G): Scape (Sc) short reaching centre of epigyne, widened near posterior tip; with smooth area on either side of scape, surrounded by looped copulatory ducts visible in transparency; copulatory openings posterior of scape tip; copulatory ducts crossing near the entrances; anterior part of ducts looped in longitudinal direction, posterior parts occupying a wider are than the frontal part.

Male. Unknown.

Distribution. The species is known from south-western and eastern D.R. Congo (Fig. 24).

Asceua radiosa Jocqué, 1986

Figs 18–21, 24

Asceua radiosa Jocqué, 1986: 309.

Type material. ***Holotype*:** Comoros • ♂; Grande Comore, Moroni; 12°15'S, 43°45'E; 4.VIII.1981; litière de jardin, (radio Comores); R. Jocqué leg.; RMCA_164051.

***Paratypes*:** • 4♀♀; same data as for holotype; RMCA_155294.

Other material examined. Comoros: • 1♀; Mohéli, Hagnamouada; 12°15'S, 43°45'E, 25.V.2003; forest edge, under rocks; D. Van den Spiegel, and R. Jocqué leg.; RMCA_213294; • 1♂; Grande Comore, en face de l'Ile des Tortues; 11°35'S, 43°20'E; 31.X.1983; sous pierres; R. Jocqué leg.; RMCA_160659; • 2♂♂; Mayotte, Mbouanatsa, pick-nick place near beach; 12°56'32"S, 45°6'5"E; 15.II.1999; concrete slab with small dead leaves and gravel; R. Jocqué and G. De Smet leg.; RMCA_208557.

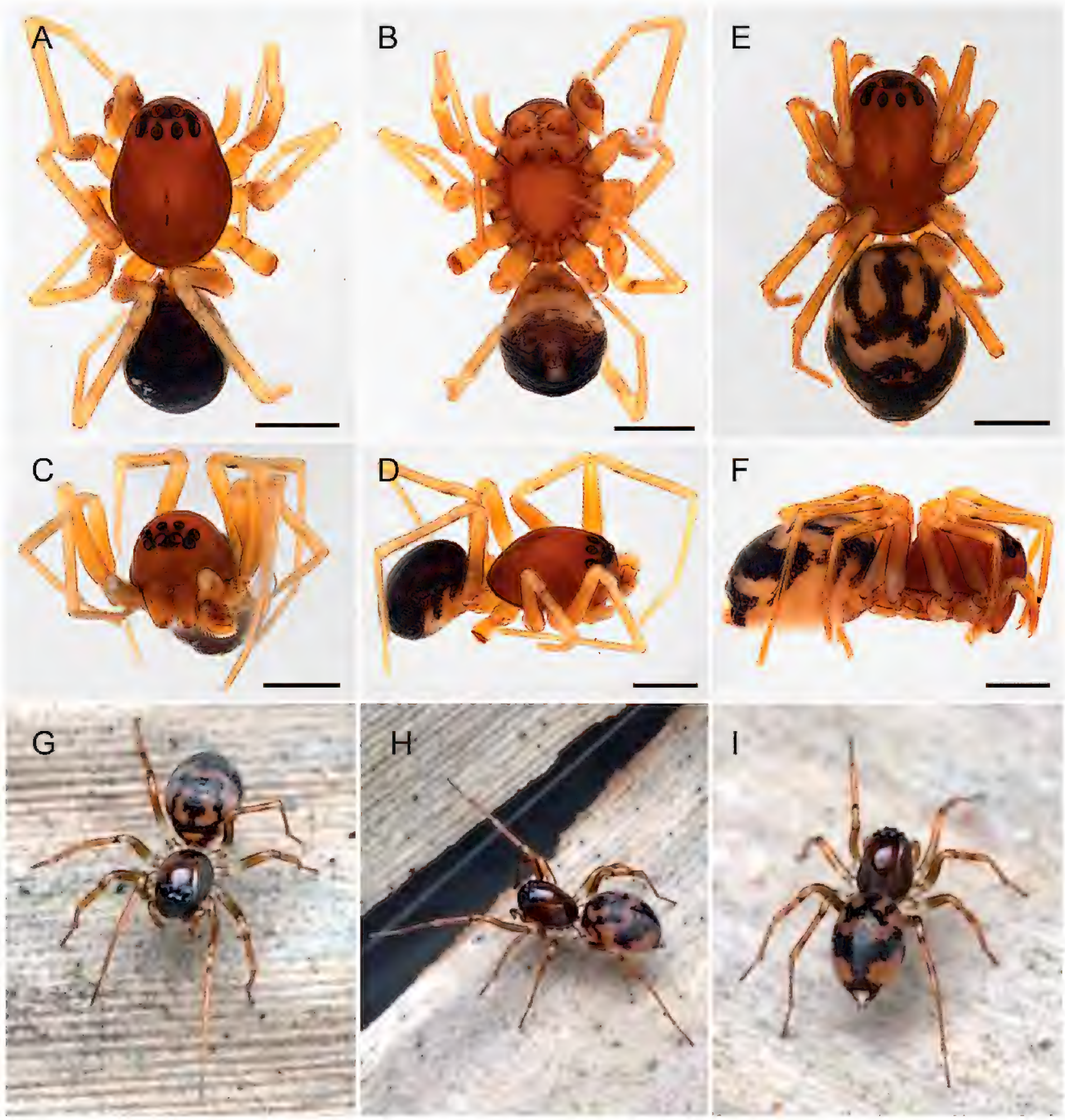

Figure 18. *Asceua radiosa* Jocqué, 1986, male and female habitus **A–D** holotype male **E, F** paratype female (RMCA_155294) **A, E** dorsal view **B** ventral view **C** frontal view **D, F** lateral view **G, H** female specimen photographed *in vivo* on Mayotte (Photo by Arnaud Henrard). Scale bars: 0.5 mm.

Diagnosis. Males and females of *A. radiosa* are easily recognised by the intricate abdominal pattern (Figs 18A, F, 20D, 21A–C). Males are further recognized by the cymbial fold reaching only half the length of the cymbium and the relatively short, non-sinuous embolus (Figs 19A–D, 20A–C); females are characterised by the absence of a scape in the epigyne, the relatively short copulatory ducts and the spherical spermathecae (Figs 19E, F, 20E).

Description. For description see Jocqué (1986: 309).

Distribution. Known from three islands of the Comoro Archipelago: Grande Comore, Mohéli, Mayotte (Fig. 24).

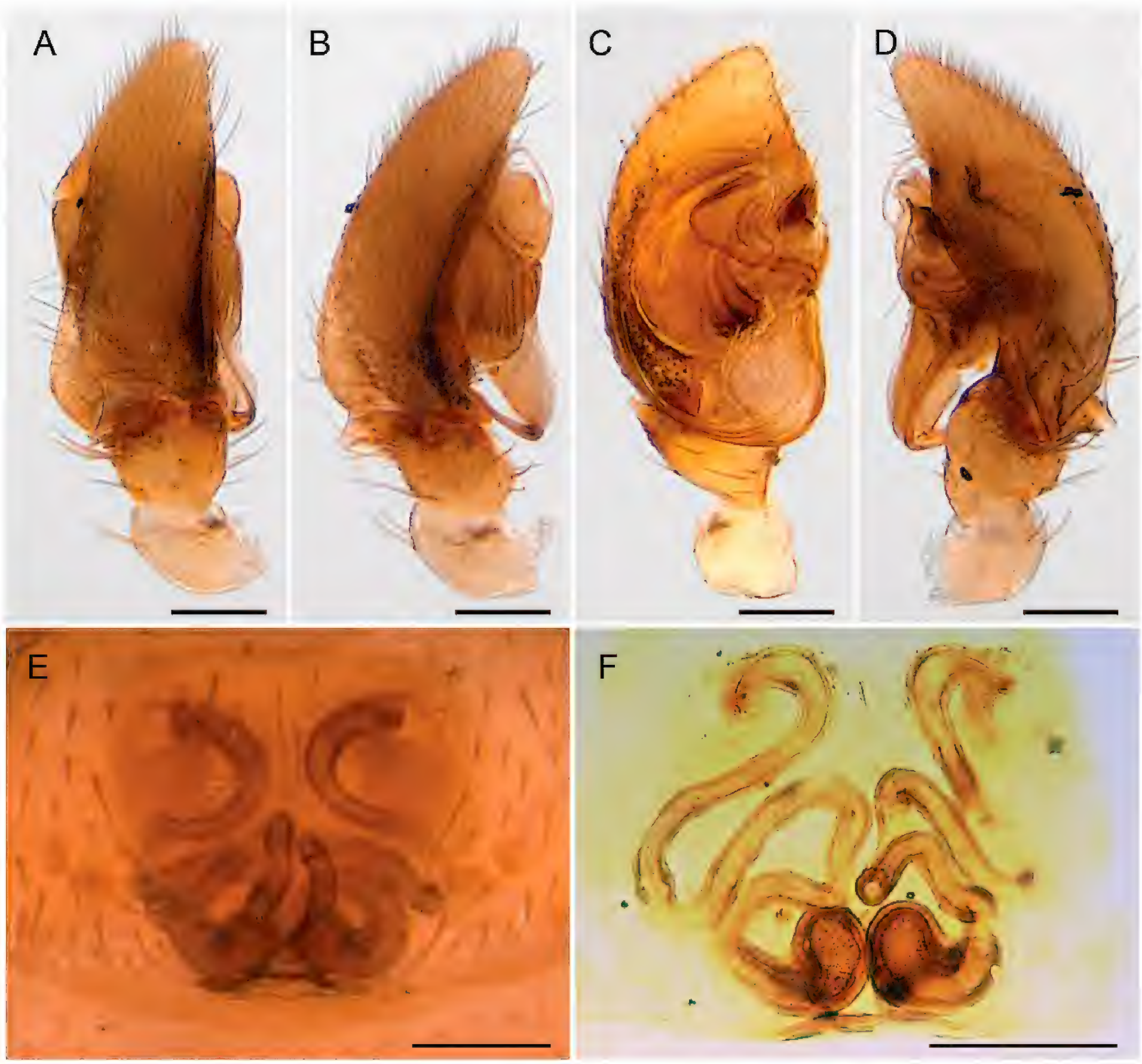

Figure 19. *Asceua radiosa* Jocqué, 1986, male and female genitalia **A–D** holotype male (right palp mirrored) **E, F** paratype female (RMCA_155294) **A** palp, dorsal view **B** idem, prolateral view **C** idem, ventral view **D** idem, retrolateral view **E** epigyne, ventral view **F** vulva, dorsal view. Scale bars: 0.1 mm.

***Asceua ventrofigurata* sp. nov.**

https://zoobank.org/A7AD9403-BAE4-48B7-9162-80FFC0DAD89A

Figs 21–24

Type material. ***Holotype*:** Tanzania • ♂; Mbeya Region, Igaya, Road to Ileje, Kabulu Forest Reserve; -9.8533, 33.5; 28.XI.1991; miombo woodland, sieved litter; R. Jocqué leg.; RMCA_247697.

***Paratypes*:** • 1♂ 2♀♀; together with holotype; RMCA_173229; • 5♂♂ 7♀♀; same data as holotype; RMCA_173168.

Etymology. The species name is an adjective referring to the abdominal venter provided with a dark pattern on pale background.

Diagnosis. Males of this species are characterised by the uniform medium brown carapace, the relatively large AME and details of the male palp: the distal

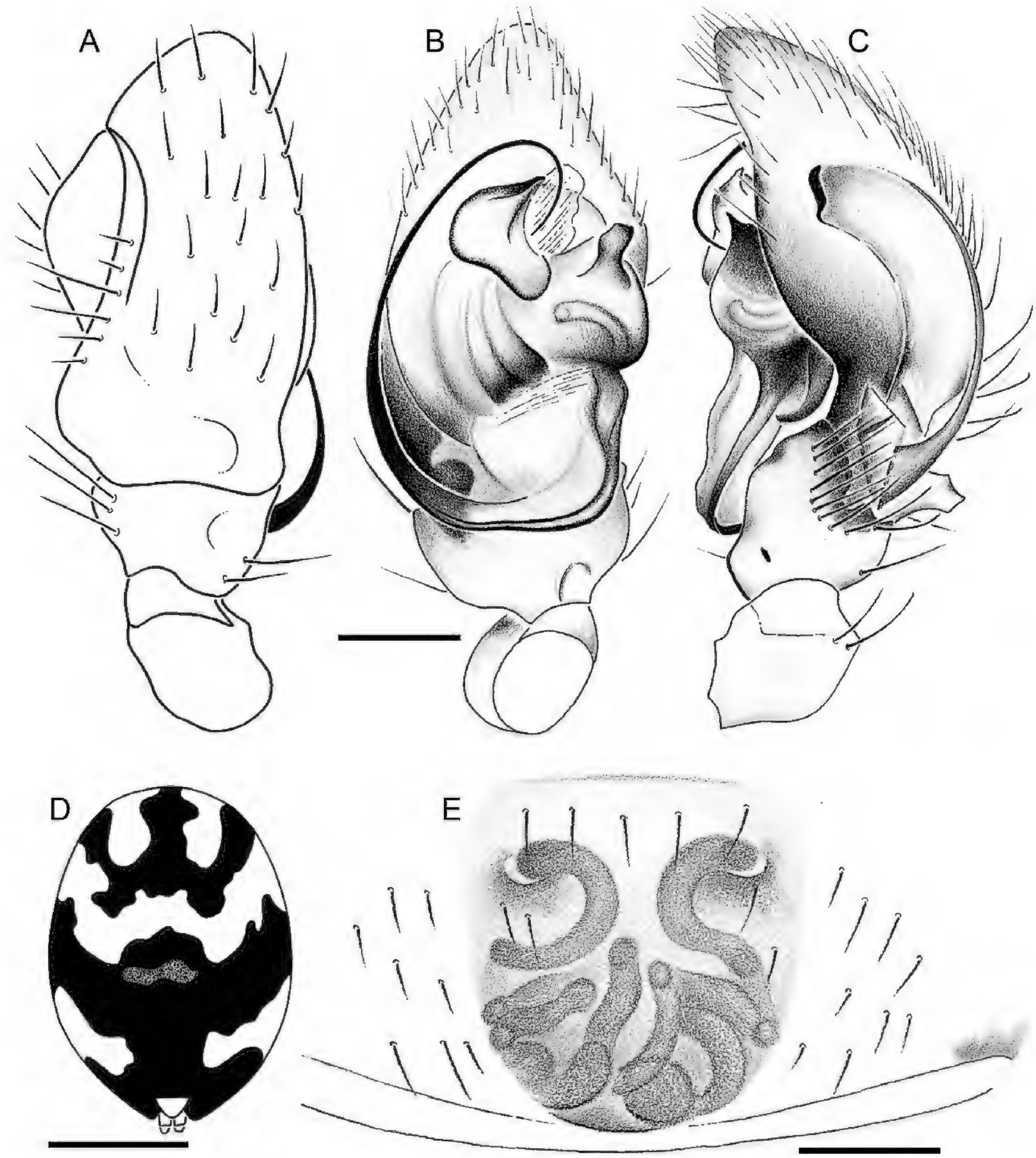

Figure 20. *Asceua radiosa* Jocqué, 1986, drawings **A–C** holotype male (right palp mirrored) **D, E** paratype female (RMCA_155294) **A** palp, dorsal view **B** idem, ventral view **C** idem, retrolateral view **D** Abdomen, dorsal view **E** epigyne, ventral view. Scale bars: 0.1 mm (**A–C, E**); 0.5 mm (**D**).

spine-shaped part of the dorsal tibial apophysis is implanted slightly before the tip directed forward at an angle of 90° with the base of the apophysis which is broad and concave in prolateral view; females are recognized by fairly large AME and the epigyne with narrow parallel sided scape and copulatory ducts hardly visible in transparency.

Description. Male Holotype. Fig. 21A–C. Total body length 3.27. Colour in ethanol: carapace uniform medium brown with narrow darker margin, narrow

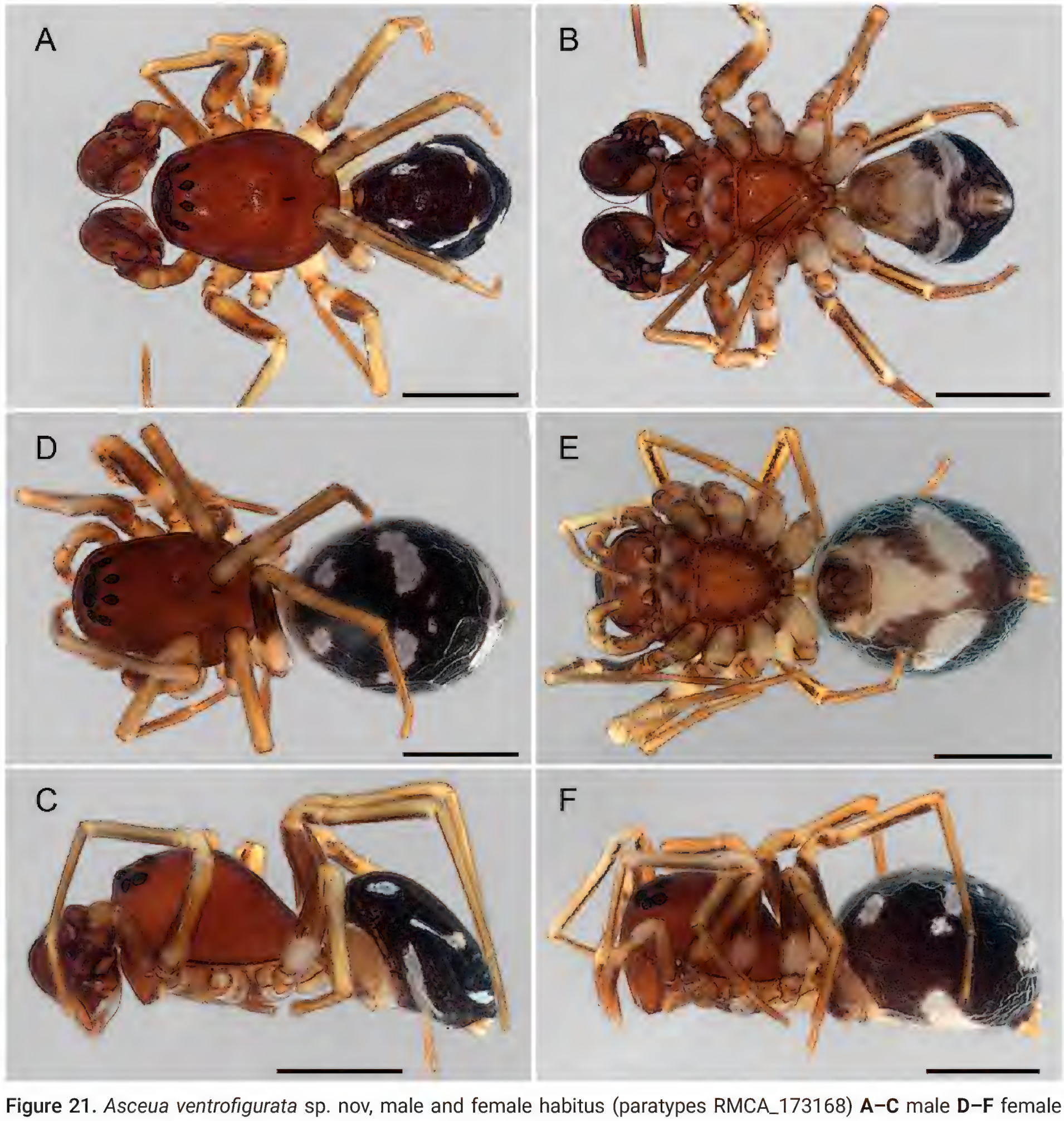

Figure 21. *Asceua ventrofigurata* sp. nov, male and female habitus (paratypes RMCA_173168) **A–C** male **D–F** female **A, D** dorsal view **B, E** ventral view **C, F** lateral view. Scale bars: 1 mm.

dark rings around eyes and rectangular dark area in front of AME; chelicerae and sternum pale brown; endites and labium medium brown with pale frontal margin; legs: femora pale with dark anterior stripes on Fe I–IV and dark posterior stripe on Fe III and IV in distal two thirds; abdomen: dorsum dark grey with dark sepia scutum covering 2/3 of abdomen length; with four pale spots adjacent to scutum: pair of short, longitudinal ones in anterior half, a pair of procurved longer ones in posterior half; sides dark with narrow longitudinal pale lines; venter pale with dark patch on each side and dark area around pale yellow spinnerets, yellow in front of epigastric fold. Carapace 1.70 long, 1.21 wide, 1.14 high. Eye sizes and interdistances: AME: 0.12; ALE: 0.08; AME–AME: 0.07; AME–ALE: 0.03; PME: 0.08: PLE: 0.10; PME–PME: 0.13; PME–PLE: 0.12. MOQ:

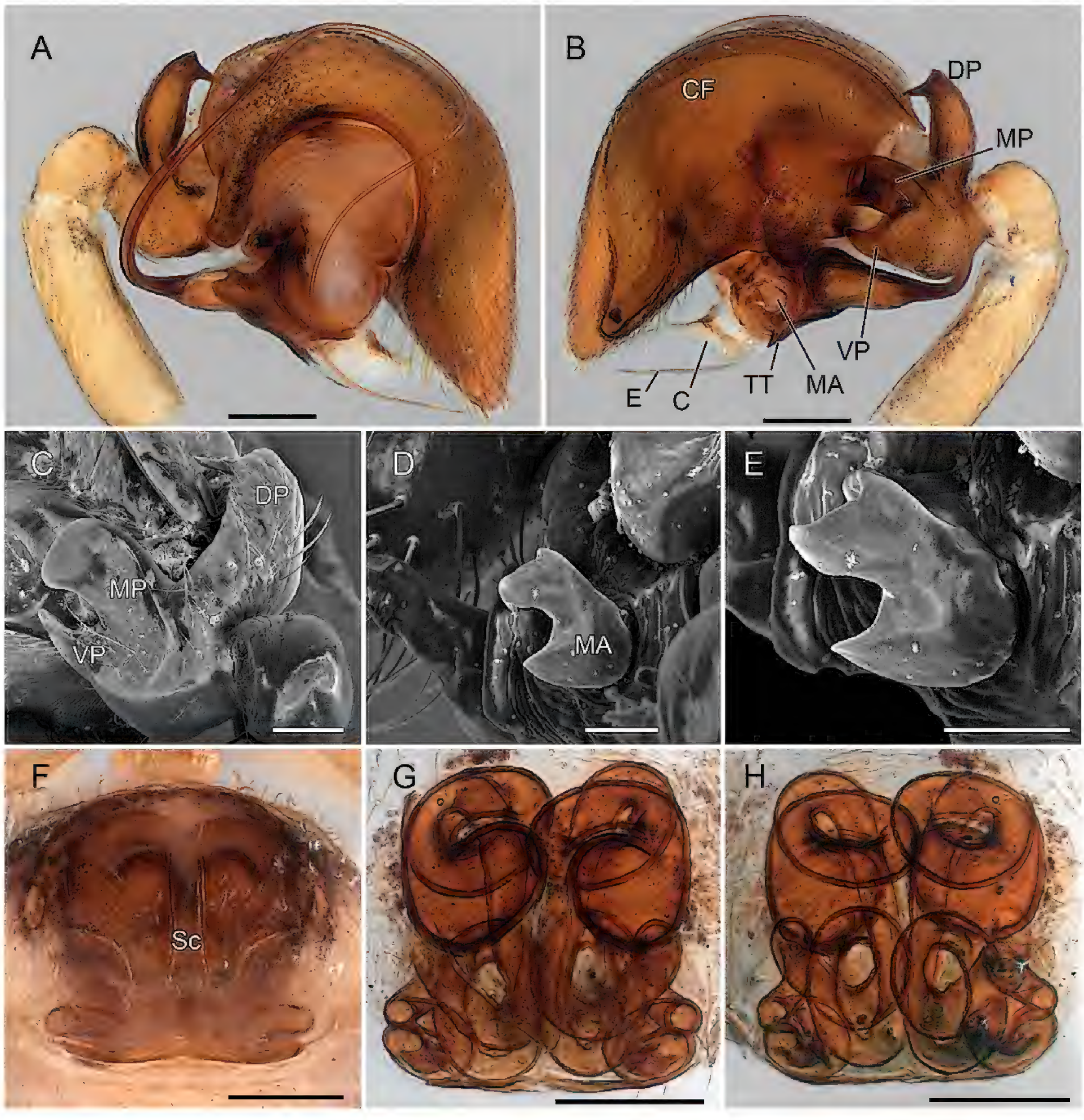

Figure 22. *Asceua ventrofigurata* sp. nov., male and female genitália **A, B** holotype male (RMCA_173229) **C–E** paratype male (RMCA_173168) **F–H** paratype female (RMCA_173168) **A** palp, prolateral view **B** idem, retrolateral view **C** SEM view of palpal tibial apophyses **D** idem, showing median apophysis **E** idem, detail view. Abbreviations: C = conductor; CF = cymbial fold; E = embolus; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; TT = tegular tooth; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm (**A, B, F–H**); 0.1 mm (**C**); 50 µm (**D, E**).

frontal width 0.30, posterior width 0.31, length 0.31. Clypeus 0.39 high. Chilum: small triangle 0.08 wide and as high. Sternum shield-shaped, 1.14 long, 0.75 wide. All femora with one short dorsal spine in proximal half; measurements in Table 9.

Palp (Figs 22A–E, 23A, B): very large: length including Ti 0.75 times carapace length. Tibia with three apophyses: dorsal one broad (DP), concave in prolateral view, slightly curved forward, with distal spine shaped prong pointing forward

Table 9. Male leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	1.26	0.42	0.98	1.12	0.63	4.41
II	0.98	0.35	0.77	0.91	0.49	3.50
III	0.91	0.42	0.70	1.05	0.49	3.57
IV	1.19	0.42	0.98	1.47	0.56	4.62

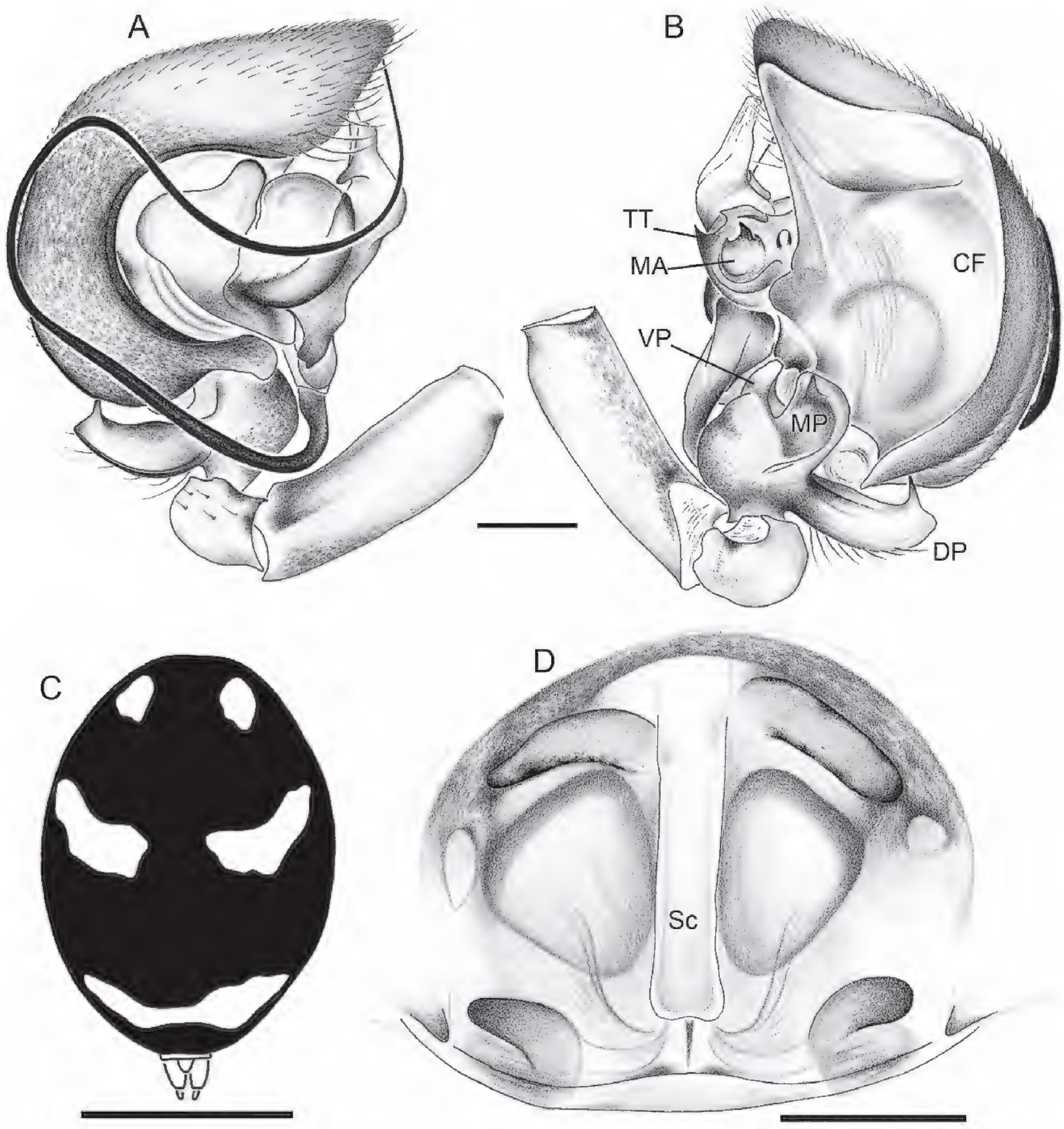

Figure 23. *Asceua ventrofigurata* sp. nov., drawings **A, B** holotype male **C, D** paratype female (RMCA_173168) **A** palp, prolateral view **B** idem, retrolateral view **C** Abdomen, dorsal view **D** epigyne, ventral view. Abbreviations: CF = cymbial fold; DP = dorsal prong of palpal tibial apophysis; MA = median apophysis; MP = median prong of palpal tibial apophysis; TT = tegular tooth; Sc = scape; VP = ventral prong of palpal tibial apophysis. Scale bars: 0.2 mm (**A, B, D**); 1 mm (**C**).

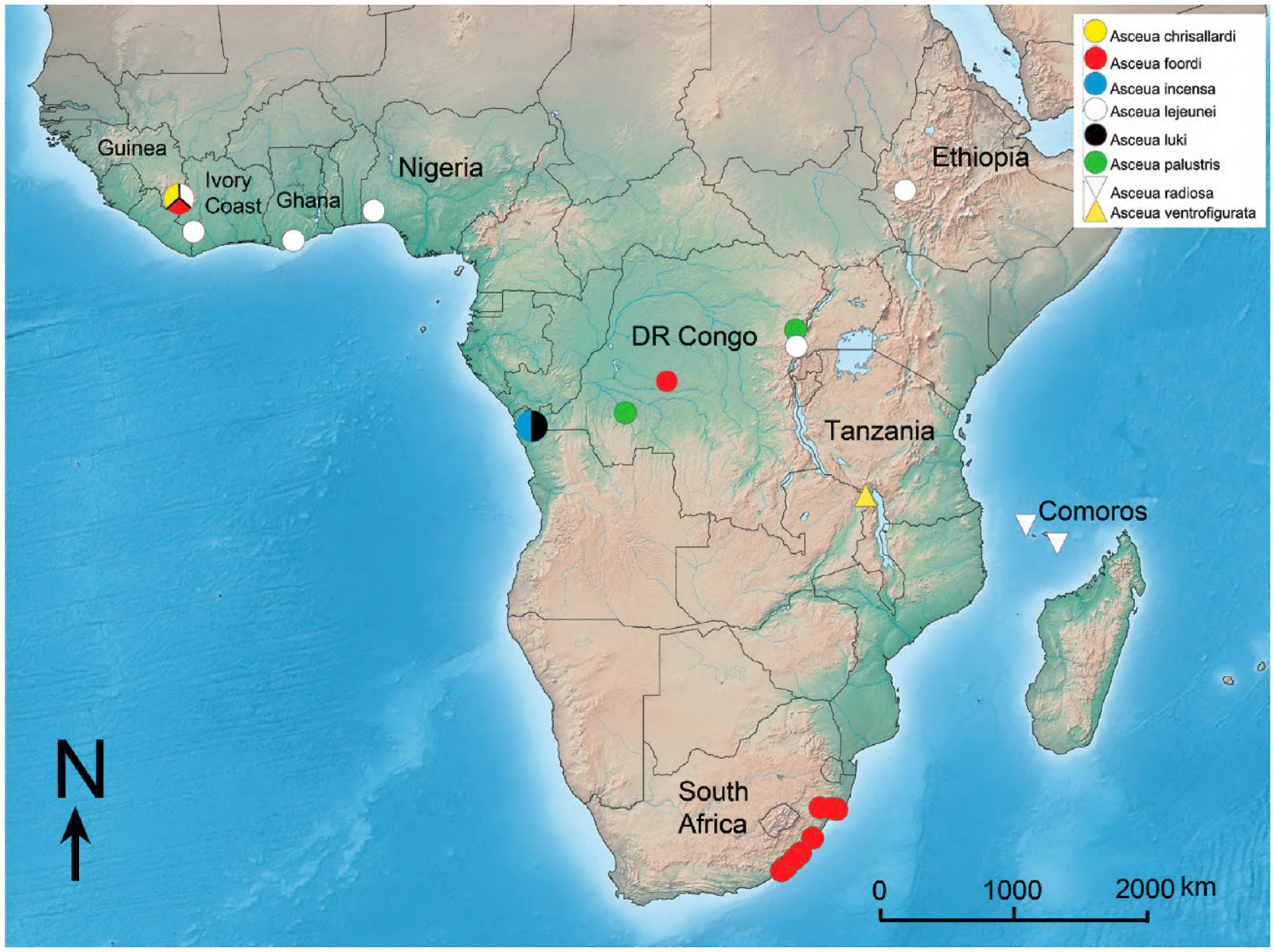

Figure 24. Distribution map of Asceua species occurring in the Afrotropics.

at an angle of 90°, inserted just under apophysis tip; median prong (MP) roughly square; inferior one (VP) short, straight with rounded extremity; cymbium laterally compressed with large lateral semicircular fold (CF); tegulum with three appendages: largest one voluminous mainly visible prolaterally, retrolateral one pear-shaped with small tapered forward directed prong, ventral one membranous, directed forward with small prolateral prong directed backward, tegular tooth sharp (TT); embolus long and whip-shaped with large triangular base directed backward, frontal margin concave.

Female Paratype (RMCA_173229). Figs 21D–F, 23C. Total body length 3.80. Colour as in male but for the absence of a scutum and presence of two extra dorsal abdominal spots: a transverse pale bar in posterior half followed by a small spot in front of spinnerets. Carapace 1.73 long, 1.20 wide, 0.91 high. Eye sizes and interdistances: AME: 0.13; ALE: 0.10; AME–AME: 0.05; AME–ALE: 0.05; PME: 0.10: PLE: 0.10; PME–PME: 0.10; PME–PLE: 0.13. MOQ: frontal width 0.31, posterior width 0.30, length 0.33. Clypeus 0.33 high. Chilum: small triangle 0.08 wide and as high. Sternum shield-shaped, 0.92 long, 0.78 wide. All femora with one short dorsal spine in proximal half; measurements in Table 10.

Epigyne (Figs 22F–H, 23D): rectangular area slightly wider behind than in front; scape widened towards posterior part situated in the centre of the epigyne; copulatory duct strongly wound, with six loops visible in transparency,

Table 10. Female leg measurements.

Leg	Fe	P	Ti	Mt	t	tot
I	0.98	0.35	1.33	0.98	0.63	4.27
II	0.91	0.35	0.63	0.84	0.56	3.29
III	0.98	0.35	0.70	0.98	0.56	3.57
IV	1.12	0.35	0.98	1.47	0.56	4.48

Variation. Males (n = 7): TL 3.00–3.36, CL 1.40–1.68; white spots on dorsum 11–13. Females (n = 9): TL 3.40–4.04 CL 1.64–1.80. The shape and configuration of the dorsal spots varies to some extent: the frontal pair may be circular or oval; the second pair comma-shaped or transverse and straight, rarely with a tiny spot behind them; the posterior spot covers the entire width, sometimes narrower, rarely divided,

Distribution. The species is known from the type locality in south-western Tanzania (Fig. 24).

Discussion

Zodariidae are among the few families for which no ballooning behaviour has been observed (Jocqué 1991). This is probably linked to their ground-dwelling behaviour. It is therefore not surprising that most species in the family have relatively small distributions as witnessed by the distribution maps of *Zodarion* Walckenaer in the Iberian Peninsula (Bosmans 1994) and of South African zodariids (Dippenaar-Schoeman 2014). In this context, the distribution patterns of *Asceua* are strange: some of them are extremely large as is the case for *A. foordi* found from Kwazulu-Natal in South Africa, through central DR Congo to as far north as Guinea in West Africa. *A. lejeunei* spans the width of the African continent as it is found from Ethiopia to Ivory Coast. It is also remarkable that some of the species are found sympatrically: *A. luki* and *A. incensa* in western DR Congo, and even three species, *A. arborivaga*, *A. lejeunei* and *A. foordi*, together on Mount Nimba in Guinea, although they are apparently found at different altitudes. Part of the explanation may be due to the fact that these species are found to be the only canopy-dwelling Zodariidae, a behaviour already mentioned by Komatsu (2016) and by Ono and Ogata (2018) for *Asceua japonica* (Bösenberg & Strand, 1906). The genus has a remarkably large distribution and is apparently the genus with the largest distribution in the Zodariidae (from South Africa and West Africa to Japan). Although there are no observations so far, it would not be surprising that these Zodariidae do indeed balloon, a behaviour linked to their arboreal lifestyle.

It is also puzzling that the species are often found in forest leaf litter on the ground, even the same species found in canopy samples as it is the case for *A. lejeunei*. It is possible that adults (juveniles are rarely collected) migrate from the canopy to the soil where it is easier to find a mate, certainly for a spider with poor eyesight that does not construct a web. If confirmed, this behaviour may be an example of the importance of whereabouts at mating time.

Since at least some of the species are canopy dwelling it can be expected that more species will be collected when more canopy studies are carried out.

A remarkable feature of the males in this genus is the similarity of their habitus to that of an ant. This is particularly obvious on the blurred picture of a live

male specimen in Fig. 6E, the palps showing great similarity to an ant's head. Many Zodariidae are known to prey on ants (Pekár et al. 2005). Observations on the biology of *Asceua* (Komatsu 2016; Ono and Ogata 2018) have revealed that these spiders prefer ants as prey. In this context it makes perfect sense that they mimic ants. This phenomenon reminds us of that of *Pranburia mahannopi* Deeleman-Reinhold, 1993, in which the habitus of an ant is obtained when the hair brushes on the frontal femora are kept together (Deeleman-Reinhold 1993). In this case, the large palps of *Asceua* males play the role of the ant's head but the effect is permanent and therefore not entirely similar to the Asiatic corinnid.

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Additional information

Conflict of interest

The authors have declared that no competing interests exist.

Ethical statement

No ethical statement was reported.

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Author contributions

Both authors carried out fieldwork, provided illustrations and prepared the text.

Author ORCIDs

Rudy Jocqué https://orcid.org/0000-0003-1776-0121
Arnaud Henrard https://orcid.org/0000-0003-3270-7193

Data availability

All of the data that support the findings of this study are available in the main text.

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